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EDITORIAL NOTES.

The Residual Products Inquiry.

THE House of Commons has, on the motion of the Chairman of Ways and Means (Mr. Whitley) agreed that it is expedient that a Joint Committee of the two Houses should be appointed to consider and report whether any, and, if any, what restrictions should be imposed on gas authorities with respect to the purchase and manufacture of the residual products resulting from the manufacture of gas by other gas authorities, or of other chemicals. The message from the Commons to the Lords regarding the motion has also been received by the latter; and probably we shall hear more of it after the reassembling of Parliament on Oct. 7. The proposition which emanated from the Private Bill Authorities of the two Houses, on the representations of the gas industry, and the endorsement of the proposition, show that the authorities are persuaded there is something further to be said from the side of the gas industry as an industry, and that the chemical clause does not in itself stand as the final word in an act of justice between parties having both commercial relations and competing interests. It is a satisfaction to the gas industry to know that the Lord Chairman and the Chairman of Ways and Means have agreed that there is subject-matter that warrants a full inquiry; and now it will be for the gas industry to show cause why there should not, on economic, public, and industrial grounds, be any interference with the conditions that existed prior to the beginning of this parliamentary session of 1912, when open markets and free competition between all interested in what we call in the gas industry the bye-products of coal carbonization—others are interested in addition to the gas industry, and those others (like the chemical manufacturers) under no statutory restriction—helped to maintain values at fair levels. It will also be for the gas industry to show that the limitation as it progresses—if allowed to progress—can only have the effect of placing the control of the prices of the raw residual products in question in the hands of the chemical manufacturers (certain of whom have for many years been in the position to pay some extraordinarily high dividends). It is neither in the public nor in the gas industry's interests that such a privileged controlling condition as this should be given to the unfettered chemical manufacturers, who are competitors of statutory gas undertakings in the markets for secondary products. The favourable position in which the chemical clause places the chemical manufacturers, to the detriment of the gas industry, is as clear as daylight to those engaged in the industry, and not less so to the chemical manufacturers themselves, or they would not have started this campaign of restriction.

There has been no date yet fixed for the inquiry. But certain facts are gathered from the parliamentary papers which are informative, and which indicate that the Parliamentary Authorities have assented to the request of the gas industry that the issues shall be investigated not from the narrow point of view of single undertakings (that is only the border of the question), but from the broader point of view as to the effects of cumulative restriction through the continued imposition of the chemical clause. The real fact of the matter in this connection is that no gas undertakings, excepting probably a very few of the largest ones, will ever, under the existing powers, exceed the manufacture of sulphate of ammonia, and a few may distil tar, and a few others make sulphuric acid. These are things that have been done for decades. It is quite probable too that, if gas undertakings are allowed to maintain a condition of affairs that will not place the control of prices in the hands of the chemical manufacturers, only a comparatively few of them (other than those that at the present time have transactions of the kind) will do anything more than relieve immediate neighbours, as and when favourable or necessary, of their liquid residuals. With conditions continued that existed prior to this session of 1912, the nearest open markets and the best prices will always be in future the factors that will control purchase and sale. That is a little digression from the statement of the information available. It is proposed for the Joint Committee to have upon it five members of the House of Commons; and these will be selected by the Chairman of Ways and Means. It may therefore be taken that the Committee will consist of five members from each House; and that the Lord Chairman will make selection of those from the House of Lords. The Committee will hear evidence from both sides; and parties interested may be represented by Counsel. We do not see why the owners of coke-ovens should not seek to be allowed to enter their protest before the Committee against placing the control of the markets for raw liquid products in the hands of chemical manufacturers. It is likewise to their interests as producers that the markets should be free and open. The inquiry and its results will apply not only to gas companies, but to local authorities owning gas undertakings; so that this is to be an inquiry affecting the whole gas industry. Mr. Whitley also made it perfectly clear, in putting the proposal for an inquiry before the House, that the report and recommendations of the Joint Committee will serve as a guide for the future decisions of Private Bill Committees. It is not at all certain when the Joint Committee will sit; but it is hoped that it will not be so long delayed that it will have any detrimental effect on the promotion of Bills next session. There need not be any reticence in this regard; inasmuch as, whatever the decision of the Joint Committee, whether Bills are promoted next session or in subsequent ones, the decision will apply.

The main thing at the present time is for the Institution of Gas Engineers and the Gas Companies' Protection Association to determine the line of action; and for every gas undertaking in the kingdom to come forward in support of the central bodies in order to show a solid backing and a unanimous sense of the injustice that, in the aggregate of its imposition and bearings, the chemical clause inflicts, and will perpetuate. All the gas industry desires is justice; and the Joint Committee will find the industry will come before them, with confidence, as sincere petitioners—not for any special protection for their own residuals markets, but only for the protection which the maintenance of open markets can confer.

While writing on this subject, it may be mentioned that we learn, from a report by the Parliamentary Committee of the Salford Town Council, that the statement, in a paragraph in our issue last week, that the Corporation had accepted the Ritchie form of chemical clause is not quite correct. What has happened is that the Corporation have agreed with the United Alkali Manufacturers' Association not to purchase or use any material other than that required for the working up of their own residual products pending the report of any tribunal which may be appointed to consider whether this, or a similar, restriction should be imposed generally on gas undertakings—the Corporation to remain bound by their agreement until such tribunal is appointed and have reported. If the report is in favour of restriction, then the Corporation are under an obligation to at once take steps to secure an amendment of their Order in accordance with the findings of the tribunal. Under the circumstances, this is a very sensible arrangement, and our hope is that the Corporation will have no occasion to apply for an amendment of their Order in this connection.

South London Gas Business and the Coal Strike.

EXAMINING the accounts of the South Metropolitan Gas Company in detail, we are not surprised at the opening paragraphs of the report of the Directors, in which they pointedly remark upon the effects of the coal strike and modern coal legislation on the finances of the half year, as well as on those for the next twelve months, and consequently on the consumers, shareholders, and employees, who are all participants in the fortunes of the Company. The Chairman (Mr. Charles Carpenter) and his colleagues have never hidden their view that, in the national interests,

the legislation of recent times applying to the coal industry has been a grievous mistake; and they have been more than justified in their views by the events that have struck deeply—but we hope only temporarily—at the roots of our national prosperity. We say, and say it deliberately, with the assurance that the Directors of the Company, as well as most other disinterested men of affairs, will unanimously support the statement, that the great coal strike, which created so unparalleled a loss for such a cause to the country, was a direct consequence of the disturbance wrought by the coal legislation of the immediate past; and the higher prices for coal with which the country has (without any substantial vindication for these prices) to encounter in its industrial operations in the next twelve months have direct descent from that legislation, through the conditions to which it has given rise. We can see no sustainable defence against this charge; but the country at large are reaping the formidable and deplorable results. They are designedly cold and poignant words with which the Directors of the South Metropolitan Company open their report: "The national coal "strike has cost the Company's consumers, shareholders, "and employees £89,000 during the last half year;" and this "to provide coal undelivered by reason of bad working "at the pits under the Mines (Eight Hours) Act, or unob-"tainable in England by reason of the national stoppage." The sum named is a serious one; and the Directors, as the trustees of the interests of the three parties concerned in the fortunes of the Company, lament the loss of the money. They might perhaps have curtailed it somewhat, by stretching the make of gas per ton, and by reducing its quality. But the Directors are trustees of not only present interests but future interests; and their ideals are such that they determined that, cost what it might, they would maintain "undiminished the "supply, quality, and purity of the gas at the usual stan-"dard"—a standard well above parliamentary requirements. The gas consumers in the area have fully appreciated this. Large as the Company is, coal gas only is made by them; but whether their experiences of the past six months will have influence, through the technical advisers of the Company, in persuading the Board to adopt carburetted water-gas plant, if only as a stand-by, is not a matter upon which we can claim any knowledge, save that past pronouncements induce the view that there will be no change in technical and administrative policy in this connection.

The one item of coal, under the circumstances that produced its increase, is a fair cause for chagrin; as had it not been for it, the Directors would have appeared before the proprietors with financial results that would have stood at the head of the Company's records, with gas at 2s. 2d. per 1000 cubic feet. The gas business has increased during the half year, the receipts for residuals are higher than before, the gas connections have made very substantial progress, the heating business has broken much fresh ground, the expenditure other than coal shows no great variation, and working has been on the high scale of merit. The whole financial drawback of the half year centres on coal; but thanks to the Company's good reserves, and the consent of the Official Auditor to the transfer from the insurance fund of £75,000 towards the abnormal expenditure—produced by external conditions, which, so far as the strike goes, were temporary—the half-year's accounts are brought to the normal state, but with the insurance fund so much the poorer. When we consider in this connection the accounts of the few undertakings that have as yet come before us for the past half year, and add together the additional costs of coal, then we are set wondering what must have been the fabulous loss that the aggregate of our national industry could lay to the charge of the coal strike were computation possible. And we have not done with it yet. There are the supervening increases in prices of both coal and freights. Fortunately, they are not likely to be permanent; and a consideration for the gas industry is that coke, it may well be expected, will produce, as one consequence of higher coal prices, still better returns. But the Directors of the South Metropolitan Company look upon the matter as grave, even in its temporary aspect; for the contracts that have been entered into for both coal and freights are "at a very con-"siderable increase over those which have been current, "with a single exception, during the past forty years, and at "prices which the industry could not sustain if they were "likely to be permanent." Prices with such baseless justification cannot expect to have any long duration; but the position is such that the coal owners are able to ride over the present contract season with their higher demands, though what the future has in store for them in the way of a reaction they know quite well.

The half-year's statistical tale of the Company is soon told; and it is all good, save for the prominently bad item of coal. Taking the figures as shown by the accounts, the amount paid for coal used (including £2883 for Port of London and tonnage dues) was £416,705. The item in the corresponding half of 1911 was £336,140; so that these figures present us with an increase of £80,565. But residuals produced an additional revenue of £23,203. There was also more coal used—5287 tons; the quantity carbonized having been 553,615 tons, compared with 548,328 tons. Touching this increase in tonnage, it looks suspiciously as though some of the coal was not of such good quality as would have been obtained under normal conditions; for we see that the make of gas, 12,275 cubic feet per ton (though better by 231 cubic feet than in the corresponding half of 1911), was less by 117 cubic feet per ton than in the second half of last year. If the conditions had enabled the average make of 12,392 cubic feet per ton of the second half of 1911 to be maintained, the quantity of coal carbonized in the first half of last year would have amply sufficed for the quantity of gas sold in the past half year, increased though it was by 2·6 per cent. The actual quantity of gas sold in the six months was 6,623,845,000 cubic feet, or an advance of 167,906,000 cubic feet—the percentage advance being practically the same as that for the first half of last year in comparison with the same period of 1910. This is a very satisfactory condition of things; and the gas receipts for the two quarters suggest that the additional consumption was well spread over the whole half year. In the Lady-day quarter, the increased takings for gas from private consumers was £8612, while in the Midsummer quarter they were £9350, or a total increase of £17,962.

The total gas receipts for the six months amounted to £704,132, or an addition of £17,635; the small difference between this and the increase of £17,962 in the receipts from private consumers being the lessened sum paid for public lighting in the half year, although there are about 100 more public lamps in the district. The prospects for the continuation of the progress of the gas business in the area harden half year by half year. The indications of the figures before us are that the heating business in the district is expanding luxuriantly. Compared with the June half of 1911, 6902 additional meters have been fixed on rent, 1527 extra cooking-stoves for ordinary consumers, 7485 further cooking-stoves for slot consumers, and 4049 gas-fires—to say nothing of those purchased outright from the Company or privately by consumers. The meters (ordinary and slot) now number 356,191; the ordinary consumers' cookers, 80,731; the slot meter cookers, 214,264, and the gas-fires 33,280—all on rent. The rental (including the receipts from gas-fittings) totalled in the half year to £120,085, or an increase of £8173 upon the sum of the first half of the year—the increases being distributed as follows: £818 for meter-rent; £1645 for stove and fire rentals; and £5710 for fittings. The revenue from residuals (£304,003), as already stated, increased by £23,203; and every item was a contributor to this substantial addition. Of it, coke was the source from which £6112 came; tar and tar products, £5335; and sulphate, £11,697. This is excellent. The total revenue came to £1,129,848, or an increase of only £46 short of £50,000.

That is the cheerful side of the account, and the side on which the proprietors must look with the greatest interest, inasmuch as certain of the heavy increases on the other side are only of a temporary nature. The sum of the expenditure is £969,635, or £131,221 more; but the greater part of the increase is found under manufacturing charges—the balance being practically made up of the extra £11,070 spent upon the repair and renewal of mains and services, and the additional charge of £10,145 for sick, accident, and superannuation funds. There are no other changes in items of outlay that are really worth mention; but the directions in which £107,373 additional expenditure has been incurred under manufacture (the total being £638,810) are of interest. There is the additional £80,565 on coal; purification cost £4341 more; salaries, £1135 more; wages, £5385 more; repairs and maintenance of works, £15,949 more. The extra for coal is an external effect; the increase in wages, an effect of higher labour values, as well as probably of heavier work in connection with the coal strike; the other items of increase are largely traceable to the higher purification standards fixed by the Directors, together with the

construction of a new type of plant which will deploy its benefits in the future. The upshot of the working is an amount transferable to the net revenue account of £160,213, or a decrease upon that of the corresponding half of 1911 of £82,165. But there was an undivided balance of £125,976 brought into the half year; and there is also the transfer of £75,000 from the insurance fund to meet the abnormal expenditure involved by the strike. With these sums and an amount of interest on bankers' balances, there is a total of £361,899 to the credit of the account. After paying interest on loans, deposits, and debenture stock, and the excellent dividend of £5 9s. 4d. per cent., there will remain a sum to be carried forward enlarged by £28,057. The insurance fund bears (and correctly so) the brunt of the cost to the Company of the strike. Upon all other aspects of the half-year's operations—business progress and good working—the Directors, the officers, and the men are, all in their several spheres and collectively, heartily complimented.

Development Opportunity.

One is often led, by fresh incidents, to cogitate over the mutations and vitality that the gas industry has displayed during the immediately past years of its history. The evidences of change and of quickened life are found throughout the industry, and more strikingly in some of its prominent parts than in others. The change and the new life have disclosed themselves in different forms. In some undertakings where dormancy has prevailed, there has been an awakening, and neglected potentialities have been brought into play with fruitful and surprising result. In other places, extraordinary local developments have supplied the old nucleus of the present-day large and flourishing undertaking with the opportunities for extended enterprise, given a progressive Board and a talented and level-headed technical and commercial adviser. Without these personal qualities in the administrative and technical work, in a case where development promises a transfer from small to large things, there is scope for much waste; with those personal qualities, there is an opportunity in these days for development on lines that will make the concern a contributor to the well-being of the district, and a source of enhanced profit to all concerned in it. One is led into this train of thought by the striking facts presented in the address of Mr. Corbet Woodall at the half-yearly meeting of the proprietors of the Tottenham and Edmonton Gas Company; and the facts are of a nature that are worth using for general illustration. It may be said that the Company have been very fortunate in its day, place, and circumstances. Admitted, and admitted freely. The area served by the Company has had an enviable expansion. Green fields have become well-populated areas; the large extending population being derived from the myriads of London's workers. Suitable property at suitable rents, suitable fares for travelling to and from London, and (among the other conveniences) suitable consideration for this particular class of population by the Gas Company with a suitable price for gas, have all contributed to the popularity of the large residential area. For the Gas Company the opportunity might have been marred without the exercise of administrative, technical, and commercial circumspection and discernment.

We hear of, and know, the effects of provident capital expenditure. The capital expenditure has been liberal at Tottenham; but it has all been wisely spent. From Mr. Woodall's figures, it is found that it is now equal to only about £402 per million cubic feet, and that next year it will be under £400 per million. This condition of the capital account is all the more surprising when the works are inspected with an eye to their engineering and architectural features. Under Mr. A. E. Broadberry's engineering guidance, the small old works have passed away, and new and extensive ones stand in their place. Incorporated in them are the types of plant of modern engineering development; and they are housed in buildings that are a credit, and not a disgrace, to the neighbourhood, and a testimonial to the architectural taste of their designer. These are the works' conditions with a capital account equal to only about £400 per million cubic feet. Capital economists whose architectural rules in gas-works construction are as straight-lined as their unpanelled walls and tarred corrugated iron sheathing, whose structures are an eyesore to the people of the localities in which they are situated, and whose buildings do not inspire men with any particular affection for their contents, have here a nut to crack in reconciling this £400 per million capital with the works situated at Tottenham, taking into account, too, the character of the business done in the supply area. This low average capital expenditure, with the excellent results of the management and the working by the co-partnership men, account largely for the figure to which the price of gas has now descended—2s. 2d. per 1000 cubic feet, with the promise of another 1d. decrease next Christmas. The considerable yearly increases in the sale of gas has also contributed to this state of things; and these things to the sale of gas. We have here the working of wheels within wheels.

For the figures as to manufacturing results and general development, readers may turn to the proceedings at the half-yearly meeting. They are worth consideration. But there was an especially noteworthy point brought out in Mr. Woodall's speech. The full statutory dividends on the consolidated stocks are at the rate of $7\frac{1}{4}$ per cent. per annum on the "A" class and $5\frac{3}{4}$ per cent. on the "B" class; and the charges for capital last half year amounted to £21,005. Referring to this figure, Mr. Woodall pointed out that the rental for the Company's property on consumers' premises—meters, cookers, heating appliances, and gas-engines—is now almost equal to the sum required to pay the whole of the capital charges for interest and dividend—the rental amounting to £20,740, while the requirements for dividend and interest amount to only a few hundreds more. That is a striking comparison. Those are among the illustrations of change in connection with an undertaking where both growing district and consequent development in works, business methods, and business gave opportunity, which has been grasped wisely and well, with advantage to all concerned. When we have a gas man such as Sir Daniel F. Goddard, M.P., trained in the old days under the old conditions (when duty was summed up in producing and distributing gas by the then existing plain and day-by-day unvarying methods), going down to Tottenham from Westminster, inspecting the works, and telling the proprietors of the Company (of which he is the Deputy-Chairman) that he is amazed at what he sees and finds to-day, compared with what obtained when he was professionally concerned in gas matters, then we who have to pass our lives amid that change are by such impressions assisted to a better realization of it all.

Fuel and Production Results.

The analysis published this week of the past half-year's financial and working accounts of the three Metropolitan Gas Companies and of four of their largest neighbours is informative. Responsible for this analytical investigation is Mr. F. J. Bradfield, the Secretary of the Commercial Gas Company; and, expert and careful as he is where figures are concerned, full reliance may be placed on the compilation. As the figures are examined, the working results project themselves upon notice. Apart from gas production per ton, an item that strikes one immediately is the considerable saving in the coke used as fuel in the case of two or three of the Companies. This is a matter to which of late more frequent attention than formerly has been paid in technical circles. The Commercial Gas Company have economized in their fuel account by 4·31 per cent., compared with the corresponding half of 1911; the percentage of coke used by them as fuel being down to 10·62. The South Suburban Company have receded in their fuel consumption by 4·08 per cent., with the fuel account standing at 11·66 per cent. The Brentford Company, however, come next to the Commercial, with 11·60 per cent.; there having, in their case, been a decline of 2·45 per cent. The South Suburban Company and the Brentford Company are running a neck to neck race in this matter. It is realized that these percentage reductions in fuel mean money. At the same time, the conditions under which coke production and fuel accounts are "kept" at some works occasionally cause a little scepticism regarding the figures that are presented. When the fuel accounts of other of the Companies included in the analysis are examined, they are found to be—some considerably—in excess of the figures already quoted. As to the make of gas per ton of coal in the half year, the Commercial Company lead with 13,110 cubic feet, having for a second the Tottenham Company with 12,781 cubic feet. The South Suburban Gas Company come out at the bottom of the list of seven, with 11,895 cubic feet. The other Companies stand at figures ranging from 12,275 up to 12,601 cubic feet per ton. The "gas production per ton" figures have all put on flesh in the half year. As to low capital expenditure, the Wandsworth Company are at the head of the list.

Paris Gas Supply Last Year.

The particulars extracted from the report of the Directors of the Paris Gas Company for the past year which will be found in another part of the "JOURNAL" furnish ample evidence of increased appreciation of the all-round value of gas. The number of consumers at the close of the year was 20,196 more than at the corresponding period of 1910, the quantity of gas sold exceeded that of the preceding twelve months by nearly 207½ million cubic feet, or 1·39 per cent., and the revenue was greater by £46,525. It is interesting to note that, of the total increase in consumption last year, no less than 7½ million cubic feet more gas was used in the daytime. Everybody knows that one of the many attractions of Paris is the brilliant lighting of the public thoroughfares. The past year witnessed a further improvement in this respect by an increase in the number of high-pressure installations from 104 to 368, or an additional illuminating power to the extent of about 750,000 candles. So satisfied are the Municipality with the new system, that it has been decided to extend it. The report contains a feature which is absolutely unique in the history of the Paris, and we venture to think of any other, gas undertaking. During the whole of last year, there was an addition of only a single ordinary burner to the number in use for the public lighting, whereas 108 of the incandescent type were put in. There were 52,718 of these burners at the close of the past year, against 1240 of the others. Though, as already mentioned, the revenue was greater last year than in 1910, the amount to be handed over to the Municipality is less by £78,762. This comes about chiefly by the placing of the Company's employees on a par with those of the Municipality in respect of retiring allowances and other matters. However, they get about £959,000 as their share of the profits; the Company have £63,474 for carrying on the concern; and the shareholders receive 5½ per cent. upon their investment. There is evidently great public confidence in the stability of the gas undertaking; for when, not long since, the Municipality invited subscriptions for a loan of £8,200,000, mainly for gas purposes, offers were received for more than eighty-two times the amount. The Directors have been rather hampered for want of money; but there will now be ample funds at their command for carrying out the schemes of extension they have in view, some indication of the nature of which is given in the report, to enable them to meet the ever-increasing demands upon their resources.

Gas as an Investment.

It is gratifying to note that, in the course of an article in the "Investor's Chronicle," the writer gives some particulars relating to the London Gas Companies, and remarks that they offer investors excellent opportunities. Attention is mainly devoted to the Gaslight and Coke Company, with regard to which the author says: "If under the 31 years of Mr. J. Orwell Phillips's guidance the Company rose to the first rank among gas enterprises, under the rule of the present Governor, Mr. Corbet Woodall, the prosperity of the undertaking has risen by leaps and bounds, and the position of its 9000 employees has been greatly improved." In addition to this Company, the London gas undertakings cited as offering excellent opportunities to investors are the South Metropolitan, the Commercial, the South Suburban, the Brentford, and the Tottenham and Edmonton. Attention is drawn to the attractive nature of the yields on the stocks in these undertakings. The weekly "Stock and Share List" in the "JOURNAL" of course makes readers familiar with these facts; but we congratulate our contemporary on bringing them to the notice of the more general classes of investors.

Home Beet-Sugar Industry.

Those who feared the action of the Government in withdrawing from the Sugar Convention would act harshly on the attempts now being made to establish in this country beet-sugar cultivation and the necessary accompanying sugar factories, will have had their fears assuaged by the statements in the House of Commons last Wednesday. The gas industry is doing its part, through the Sulphate of Ammonia Committee, in giving encouragement and enlightenment in the shape of the necessary fertilizer for a considerable acreage of beet; and Wednesday's debate in the House on the withdrawal of the Government from the sugar convention, threw new light on the attitude of the Government towards this nascent home industry. Mr. Acland, the Under-Secretary for Foreign Affairs, first bid those interested in the native beet experiment to be of good cheer, and banish anxiety. But it is clear that words alone will not bridge the handicapping difference between a newly starting industry in this country and fully grown competing industries in other countries. It is, however, gathered from the remarks of the Premier that the Government have in their minds some material help. He stated that he saw no reason why this nascent industry should not receive assistance from the development fund in its early stages; and Mr. Bonar Law later on observed that he was sure Mr. Asquith would not have said what he had unless he had intended to encourage the industry. In view of this, the position looks decidedly better than was the case when the news first came that the Government had withdrawn from the Convention.

The Purification of Spent Liquor.

We are afraid gas undertakings must in future look for greater inquisitiveness on the part of local authorities as to the means adopted for the treatment and disposal of the waste liquor from sulphate of ammonia plants. The subject was (as seen in the "JOURNAL" last week, and again this week) brought prominently before the York congress of the Royal Sanitary Institute. This extensive examination of the subject before those interested in the sanitary conditions of our cities and towns will not lighten the attention bestowed upon it by our local governors and their responsible officials. But it is hoped that superficial knowledge will not be used to carry views and action to the extreme, and to blind local authorities to the demonstrated fact that, within observed limits, no evil result is found to accrue from the discharge of the spent liquor into sewers, where the treatment of the sewage is by other means than the bacterial one. The table that Mr. Reginald Brown gives in his paper (of which an abstract is published to-day) indicates that about one-third of the 200 gas-works at which inquiry was made discharge the effluent from their sulphate of ammonia plants into the sewers; but the paper does not show that where the proportion of the discharge is below 1 per cent. of the dry weather flow of the sewerage system any harm results. There are also simple precipitation methods applied at gas-works which permit of a clear effluent being discharged into the sewers, and which the paper reports as effectual. But the simple purification process of Mr. J. Radcliffe which various works have adopted has the highest encomiums passed upon it for its effectiveness in obviating all trouble. The beauty of this process is that it is made part and parcel of the sulphate plant; and the running cost is of small account. The trouble arising from the discharge of spent liquor has been accentuated, with the spread of the septic treatment of sewage, through the destruction of the bacteria by the compounds contained in the liquor; and to this must be attributed the increased concern of those responsible for the sanitary well-being of communities. To avoid trouble, and to assist the local authority in the scientific treatment of the sewage, the most effective plan that experience suggests is the purification of spent gas liquor by the method that has, through its results, established its merit.

The Objects and Powers of Trade Unions.

The question of the amendment of the law as to the objects and powers of trade unions has again been taken in hand by the Government, in the shape of the reintroduction of what is known as the Trade Unions (No. 2) Bill. With one exception, this is the same Bill as the one brought forward last year; the exception being the omission of the provision formerly made for the payment of Members of Parliament—this, of course, having been rendered unnecessary by subsequent events. There are eight clauses to the Bill, the aim of which is to render the Osborne judgment no longer applicable to the unions. In this case, the House of Lords held that under existing Acts trade unions could not devote their funds to political purposes, or make levies for such objects, and that the sphere of activity of the unions must be confined to industrial purposes. This was the reason, said the Attorney-General, when moving the second reading of the Bill last week, why the judgment had "become one which could not be allowed to stand in its integrity, and must be to some extent mitigated." The Bill lays down three conditions which have to be complied with before the funds can be employed for political purposes. In the first place, there must have been a ballot of the members. Secondly, payments for political objects must be

made out of a separate fund, and any member of the union is to be exempted from obligation to contribute to such a fund, if he gives notice of his unwillingness to do so. The third stipulation is that a member who may have thus been exempted from the obligation to contribute to the political fund of the union "shall not be excluded from any benefits of the union or be placed in any respect, either directly or indirectly, under any disability or at any disadvantage as compared with other members of the union (except in relation to the control or management of the political fund) by reason of his being so exempt, and that contribution to the political fund of the union shall not be made a condition for admission to the union." A schedule to the Bill consists of a form of exemption notice for the use of those unwilling to contribute to the political fund. The "political objects" referred to are the expenditure of money on: (1) The payment of any expenses incurred either directly or indirectly by candidates for election to Parliament or any public office; (2) the holding of meetings or the distribution of literature or documents in support of any such candidate; (3) the maintenance of any person holding a public office; (4) in connection with the registration of electors or the selection of a candidate for Parliament or any public office; and (5) on the holding of political meetings or the distribution of political literature or documents of any kind. The Bill was read a second time, and referred to a Committee of the Whole House. Those who disagree with the Government in their view that trade unions ought not to be confined to the sphere of industrial activity will hope that the measure does not finally pass into law.

Syndicalism in Wales.

A speech delivered some days ago by Mr. Philip Snowden, M.P., contained, as reported, some noteworthy reflections on strikes, which it was remarked could never be successful as a weapon of frequent or constant use under modern conditions. With the exception of one or two instances where the circumstances were exceptional, he has failed to find any record during the past fifteen years of Labour having struck successfully against federated Capital. He foresees the likelihood in the immediate future of great revival of political action "because recent strikes, including the railway strike and the coal miners' strike, although they appeared to be successful, were in reality lamentable failures." The question of "political action," and its relationship to the Trade Unions (No. 2) Bill, is, of course, "another story." The confession of the ineffectiveness of strikes for obtaining better conditions is welcome; and it is to be hoped that this destructive weapon is not to be wielded in a less righteous cause. In some quarters there is evidently a fear that this may be so. In the course of a long article dealing with Syndicalism in the Welsh coalfield, the "Western Mail" makes the statement that adherents of Syndicalist thought are multiplying themselves in the mining valleys with the same rapidity as marked the Socialist movement a few years ago. In the various coalfields, there are missionaries in abundance; and the experience is that they have found their best soil among the more imaginative miners of South Wales, though other fields also now have many subscribers to the new faith. The object of the writer of the article is to draw attention to the extent to which the supporters of this new movement dominate some of the district lodges of the Miners' Federation, and the results that would probably attend the success of their efforts to "capture" the Federation. The first thing desired is the transfer of the government of the trade unions into the hands of a central organization which shall direct the policy for the whole body of the men, and thus destroy the executive control of the different districts; and it is to prevent the accomplishment of this that the "Western Mail" appeals to the miners. The idea of getting all industries into the possession of the workers, and to do this by making privately-owned industries unprofitable, is not one that can be calmly regarded; and any strike or curtailment of production that arises from the furthering of this policy will deserve to be as unsuccessful—and, if the public can be brought to realize clearly the danger of the position, they will be as unsuccessful—as Mr. Snowden states recent strikes have been.

Alderman ROBERT RICHARDS, J.P., for about twenty years Chairman of the Water Committee of the Wigan Corporation, died last Thursday in his 81st year. He was an honorary freeman of the borough, and was Mayor for 1896-7. One of his sons, Mr. Tom Richards, is engaged in the Gas Department of the Corporation.

PERSONAL.

At the annual meeting of the Society of Chemical Industry, which will be held in New York early in September, Mr. CHARLES CARPENTER will be elected a member of the Council.

We learn that Professor BONE has been invited to deliver an open lecture before the German Chemical Society, in the Hofmannhaus, Berlin, on "Surface Combustion;" and that he has arranged to do so on the evening of Saturday, Nov. 30.

A short leet of fourteen has been selected out of the 96 applicants for the new post of Commercial Superintendent about to be created in the Glasgow Corporation Gas Department. A further reduction is to be made before any of the candidates are asked to appear at the Committee meeting. The salary offered is £500 per annum.

Owing to the pressure of business engagements, Mr. JACQUES ABADY has resigned his seat on the Westminster City Council. Mr. Abady, it will be remembered, was the Chairman of the Lighting Committee, and was to a large extent responsible for the gas lighting contract entered into by the Council early in 1910, of which he gave particulars in a paper read before the Institution of Gas Engineers the following June.

The staff of the Ipswich Gaslight Company met recently to make a presentation to one of their colleagues, Mr. CHARLES E. WRIGHT, who was shortly to be married. Mr. J. T. Jolliffe, the Engineer, in a few well-chosen words, asked Mr. Wright's acceptance of a handsome fumed-oak roll-top writing desk, as a mark of esteem and good wishes from his fellow-workers. Mr. Wright is the Assistant Works' Manager to Mr. Frank Prentice. He is the youngest son of Mr. James Wright, and was trained with Messrs. Ashmore, Benson, Pease, and Co., and was later under Mr. W. Woodward, of Bromley. The bride was Miss Ada Oswald Crisp, the only daughter of Mr. R. O. Crisp, of Coggeshall, Essex; and the wedding took place last Thursday.

Mr. JOSEPH BRADLEY, who has been engaged in the Water Department of the Bolton Corporation since his boyhood, and has risen to the position of collector and surveyor of revenue, has now been appointed Superintendent of the Department, in succession to Mr. WILLIAM HUTCHINSON, who has retired. Mr. Bradley's appointment is to date from the 1st inst.; and the commencing salary is £300 per annum. Mr. Hutchinson's services are to be retained as a consultant. His connection with the undertaking dates from 1875; and the Water Committee have placed on record their appreciation of the indefatigable and valuable services he has rendered to the Department, coupling with this the sincere hope that he may speedily recover from his present illness and enjoy good health for many years.

There were 95 applicants for the position of Gas Manager to the Maryport Urban District Council, in succession to Mr. Horatio Morris, whose resignation was announced in the "JOURNAL" for the 23rd ult., in which issue the vacancy was advertised. These were reduced to eight, who were interviewed by the Gas Committee (consisting of the whole Council) last Friday, when the number was brought down to three. Eventually Mr. CLEMENT HARRIS, of Great Wigston, near Leicester, was selected. He is an intermediate B.Sc. (London), an Honours Medallist of the City and Guilds of London Institute in "Gas Manufacture" and "Gas Distribution," and a holder of seven first-class certificates from the Board of Education for scientific subjects and of two from the Royal Society of Arts for "Book-keeping." The question of putting down regenerator retorts has, we learn, been before the Council of late, and has aroused considerable opposition. Mr. Harris tried to get a guarantee that the Council would instal these retorts, but failed to obtain it. The councillors favouring them put questions on this matter to the various candidates, and were told that the extra quantity of gas produced ran up to 1500 cubic feet per ton of coal. As the saving to be effected on the figures placed before the Council by the Chairman of the Gas Committee were based on an extra 1000 cubic feet only being secured, the proposal appears to stand a more favourable chance of acceptance.

Gas and Water Exhibition at Breslau.

It is reported that there will be held at Breslau, from the 17th to the 25th inst., an extensive gas and water exhibition, in connection with the annual meeting of the Union of German Gas and Water Officials. It is stated that all important firms connected with the gas and water industries in Germany will be represented, and that the demand for space by exhibitors has been greatly in excess of that available. Nevertheless a special section has been reserved, at nominal entrance fees, for exhibits which can undoubtedly be ranked as novelties. Lectures on cooking by gas, with demonstrations, will be given on several days by lady members of the staff of the Central Publicity Organization of Berlin, and three special lectures will be delivered for works' officials and technical men. Two of these will deal with gas—viz., "On the Practical Control of the Manufacture of Gas and its Bye-Products," and on "Modern House Installations and Fitting, and their Effect on the Use of Gas," both by Herr Othmer, one of the Chief Engineers attached to the Central Organization. The third lecture, by Dr. Wagenknecht, of Breslau, will deal with the quality of public water supplies.

COMPARATIVE WORKING RESULTS OF THE LONDON AND FOUR SUBURBAN GAS COMPANIES

IN THE HALF YEAR ENDED JUNE 30, 1912.

Compiled by Mr. F. J. BRADFIELD, the Secretary of the Commercial Gas Company.

	Gaslight and Coke.	South Metropolitan.	Commercial.	Brentford.	Wandsworth.	South Suburban.	Tottenham.
Gas sold . . . . . thousands	13,368,247	6,623,845	1,662,999	1,581,414	611,519	743,529	896,360
Increase . . . . . per cent.	1·94	2·60	1·23	7·59	3·16	1·64	10·36
Gas made per ton of coal . . . . cubic feet	12,601	12,275	13,110	12,411	12,321	11,895	12,781
„ „ per gallon of oil . . . . „	408	..	417	393	413	402	426
Gas unaccounted for . . . . . per cent.	7·11	1·26	5·52	5·89	4·70	0·12	3·06
Coke made for sale per ton of coal . cwt.	9·96	9·33	11·17	11·05	10·52	10·09	9·42
Tar made per ton of coal . . . . galls.	9·70	9·42	11·09	..	8·65	10·00	..
Liquor made per ton of coal . . . galls, 8 oz.	37·75	40·13	35·61	38·35	34·95	40·25	37·48
Percentage of coke used as fuel	21·22	24·16	10·62	11·60	15·86	11·66	21·52
Capital expended per 1000 cubic feet sold during the past year	s. d. 11 4·29	s. d. 8 3·11	s. d. 8 8·91	s. d. 7 10·46	s. d. 6 7·93	s. d. 7 11·33	s. d. 8 0·50
Price charged per 1000 cubic feet	2/6, 3/- to 2/2	2 2	2 4	2 5	1 9	2 4	2 2
Costs per 1000 Cubic Feet of Gas Sold.							
REVENUE ACCOUNTS.	d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.	11·75	15·10	11·52	14·19	12·62	13·80	12·75
Less residuals—Coke and breeze	5·99	6·68	4·84	4·87	6·49	8·03	4·84
Tar	1·31	1·55	1·69	1·66	1·62	1·66	1·46
Amm. liq. and sulph. amm.	2·12	2·78	1·65	1·23	1·67	2·66	1·35
Total residuals . . .	9·42	11·01	8·18	7·76	9·78	12·35	7·65
Net for coals . . .	2·33	4·09	3·34	6·43	2·84	1·45	5·10
MANUFACTURE—							
Salaries	0·31	0·60	0·45	0·41	0·21	0·62	0·30
Wages—carbonizing	1·84	1·78	1·56	1·44	2·08	1·27	1·32
Purification	0·28	1·09	0·25	0·32	0·24	0·05	0·32
Repairs—plant	3·92	4·57	4·73	4·20	5·79	4·12	4·52
Net manufacture . .	8·68	12·13	10·33	12·80	11·16	7·51	11·56
DISTRIBUTION—							
Wages and salaries	1·08	0·78	0·75	1·67	1·12	1·25	0·97
Repairs—Mains and services, &c.	1·78	1·64	1·31	2·49	1·71	1·45	4·09
„ Meters and prep. meters and fittings	1·98	2·84	2·12	1·58	1·11	2·29	1·55
„ Stoves—ordinary and prepayment .	1·58	1·43	1·58	1·17	1·00	1·18	0·86
Total net manufacture and distribution .	15·10	18·82	16·09	19·71	16·10	13·68	19·03
Public lamps—lighting and repairing	0·50	0·57	0·38	0·83	0·53	0·71	0·80
Rents, rates, and taxes	3·04	2·00	2·33	1·97	1·05	1·80	1·60
MANAGEMENT—							
Directors, Auditors, and salaries (Secretary, &c.)	0·25	0·28	0·34	0·51	0·70	0·73	0·39
Collectors	0·49	0·59	0·71	0·55	0·42	0·55	0·49
Stationery and general charges	0·26	0·57	0·49	0·28	0·32	0·40	0·50
Profit-sharing	0·41	1·06	0·51	..	0·48	0·62	0·52
Bad debts	0·12	0·06	0·06	0·09	0·03	0·04	0·03
Law and parliamentary charges	0·04	0·05	0·06	0 04	0·35	0·93	0·04
Superannuations, &c.	0·77	0·64	0·26	0·37	0·16	2·00	0·07
Sundries	0·05	0·02	0·02	..	0·01	..	..
Total expenditure (*less* residuals) . . .	21·03	24·66	21·25	24·35	20·15	21·46	23·47
GAS	29·43	26·05	27·41	29·12	21·36	28·38	26·18
Rentals—Meters and prep. meters and fittings	2·54	3·13	2·69	3·19	3·35	0·96	1·94
Stove	1·10	1·22	1·58	0·87	1·16	1·55	3·61
Incand. mantle maintenance . . .	..	..	0·11	..	0·28	..	0·17
Miscellaneous	0·10	0·06	0·01	0·01	0·16	0·03	0·04
Total—Gas, rentals, &c.	33·17	30·46	31·80	33·19	26·31	30·92	31·94
Balance, being profit	12·14	5·80	10·55	8·84	6·16	9·46	8·47
Dividend and interest	10·79	7·50	9·35	7·04	5·88	7·05	5·62
Surplus	1·35	Def. 1·70	1·20	1·80	0·28	2·41	2·85
Contribution to funds out of surplus	0·84*	..	..	..	..	..	0·27†
SUNDRIES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	12 4·13	15 0·65	13 4·24	..	13 0·07	13 9·09	14 11·64
Coke realized per ton of coal	6 11·88	6 5·93	7 8·41	7 4·66	8 4·45	8 4·05	7 1·64
Coke „ „	14 0·36	13 11·00	13 9·44	13 4·44	15 11·03	15 8·76	15 1·93
		Per Yard.				Per Yard.	Per Chal.
Breeze „ „	5 6·32	1 5·80	3 4·31	3 8·59	1 10·16	2 8·59	1 0·51
Tar realized per gallon	0 2·04	0 1·97	0 2·53	0 2·13	0 2·63	0 2·06	0 2·23
Amm. liquor, &c., realized per butt	7 8·05	7 5·67	8 3·80	5 3·57	6 9·36	7 7·06	5 9·85
Percentage of stoves at rental to consumers . .	74·00	91·00	63·00	..	89·00	87·00	46·00
Bad debts per cent. on total receipts. . . .	0·28	0·15	0·14	0·21	0·07	0·09	0·08
Net profit per cent. on ordinary capital . . .	5·78	4·01	6·23	14·94	7·07	8·30	9·21
One penny variation equals in half year . . .	£55,701	£27,599	£6929	£6589	£2548	£3098	£3735
Carb. water gas, per cent. on total make . . .	23·73	..	38·81	37·50	26·58	7·86	32·25

* Special purposes fund, redemption fund, and sundries.

† Insurance fund.

Preventing Formation of Thick Tar in Gas Making.—A Berlin firm have patented apparatus to prevent formation of thick tar in the manufacture of illuminating gas. According to an abstract of the specification in the "Journal of the Society of Chemical Industry," between the ascension-pipe and the hydraulic main a washer is interposed in which the higher-boiling hydrocarbons are removed from the gas by washing with water, tar, or gas liquor. A closing device is provided which can be used as desired for controlling communication between the washer and the retort, or for opening or closing an orifice through which air may be introduced into the retort or through which access can be gained for cleaning the pipes connecting the washer and the retort.

COMPARATIVE WORKING RESULTS OF THE LONDON AND FOUR SUBURBAN GAS COMPANIES.

TABLE SHOWING THE INCREASES OR DECREASES IN THE HALF YEAR ENDED JUNE 30, 1912.

[The figures in heavy type show the decreases.]

Compiled by Mr. F. J. BRADFIELD, the Secretary of the Commercial Gas Company.

——	Gaslight and Coke.	South Metropolitan.	Commercial.	Brentford.	Wandsworth.	South Suburban.	Tottenham.
Gas sold . . . . . thousands	402,039	167,906	20,160	111,599	18,722	11,968	84,136
Increase (variation equal to) . . . per cent.	**2·83**	**·02**	**2·19**	2·52	**5·15**	**3·37**	4·18
Gas made per ton of coal . . . . cubic feet	675	231	655	797	301	108	585
,, ,, per gallon of oil . . . . ,,	**53**	..	**8**	23	53	402	**3**
,, unaccounted for . . . . . per cent.	**·70**	1·16	·14	·50	**·29**	**1·71**	·64
Coke made for sale per ton of coal . cwt.	**·09**	**·31**	·54	·30	·20	**·02**	·42
Tar made per ton of coal . . . . galls.	·14	**·34**	1·05	..	**1·58**	·53	..
Liquor made per ton of coal . . . galls, 8 oz.	1·55	**0 ·25**	**3·62**	8·06	**1·03**	1·50	**6·26**
Percentage of coke used as fuel	·63	2·21	**4·31**	**2·45**	**1·54**	**4·08**	**1·81**
Capital expended per 1000 cubic feet sold during the past year	s. d. 0 0 97	s. d. 0 0·08	s. d. **0 0·06**	s. d. **0 1·58**	s. d. **0 0·75**	s. d. **0 5·00**	s. d. **0 3·99**
Price charged per 1000 cubic feet	**0 1·00**	..	..	**0 2 00**	..	**0 1·00**	**0 1·00**
Costs per 1000 Cubic Feet of Gas Sold							
REVENUE ACCOUNTS.	d.	d.	d.	d.	d.	d.	d.
Coals, oil, &c.	**1·09**	2·60	**1·36**	**·44**	**·34**	**1·10**	**·87**
Less residuals—Coke and breeze	**·34**	·05	**·56**	**·12**	**·89**	**·17**	·05
Tar	·06	·16	·53	·49	·23	·42	·41
Amm. liq. and sulph. amm .	**·06**	·36	**·10**	**·30**	**·17**	·04	**·01**
Total residuals . . .	**·34**	·57	**·13**	·07	**·83**	·29	·45
Net for coals . . .	**·75**	2·03	**1·23**	**·51**	·49	**1·39**	**1·32**
MANUFACTURE—							
Salaries	·01	·03	·03	..	·05	·06	**·02**
Wages—carbonizing	·05	·15	·08	**·11**	**·01**	·03	**·08**
Purification	·02	·13	**·03**	·07	**·01**	**·07**	**·08**
Repairs—plant	**·48**	·47	**·29**	**·39**	**·02**	**2·57**	**·76**
Net manufacture . .	**1·15**	2·81	**1·44**	**·94**	·50	**3·94**	**2·26**
DISTRIBUTION—							
Wages and salaries.	·08	..	·04	·14	·09	·08	·03
Repairs—Mains and services, &c. . . .	·25	·37	·16	·01	**·12**	**·19**	**·66**
,, Meters and prep. meters and fittings	·15	**·10**	·15	·69	**·24**	**1·59**	·30
,, Stoves—ordinary and prepayment .	·18	..	·09	·21	**·08**	·27	·86
Total net manufacture and distribution .	**·49**	3·08	**1·00**	**·11**	·15	**5·37**	**1·73**
Public lamps—lighting and repairing	·01	**·04**	·03	·24	**·07**	·04	·08
Rents, rates, and taxes	·05	**·06**	·20	**·03**	·05	·06	·03
MANAGEMENT—							
Directors, Auditors, and salaries (Secretary, &c.)	..	..	**·04**	**·03**	·08	**·03**	**·03**
Collectors	·02	·02	..	**·01**	·02	·02	**·04**
Stationery and general charges	·03	·01	·05	..	**·07**	**·01**	·05
Profit-sharing	·10	·05	·02	..	·12	·09	·02
Bad debts	**·03**	**·01**	**·02**	**·02**	..	..	**·03**
Law and parliamentary charges	**·01**	**·02**	·03	**·14**	·35	·89	**·02**
Superannuations, &c.	·28	·36	·04	·05	**·01**	1·66	..
Sundries	·01	..	..	..	..	..	..
Total expenditure (*less* residuals) . . .	**·03**	3·39	**·69**	·17	·62	**2·65**	**1·67**
GAS	**·94**	**·01**	**·13**	**1·94**	**·02**	**1·03**	**1·11**
Rentals—Meter and prep. meter and fittings	·21	·16	·19	·15	·10	·01	**·07**
Stove	·06	·03	·06	·04	·03	·09	·23
Incand. mantle maintenance . . .	..	..	·01	..	·13	..	**·02**
Miscellaneous	·01	..	..	..	**·02**	**·01**	·02
Total—Gas, rentals, &c.	**·66**	·18	·13	**1·75**	·22	**·94**	**·95**
Balance, being profit	**·63**	**3·21**	·82	**1·92**	**·40**	1·71	·72
Dividend and interest	**·06**	**·23**	**·12**	·79	**·11**	·03	**·38**
Surplus	**·57**	**2·98**	·94	**2·71**	**·29**	1·68	1·10
Contributions to funds out of surplus	**·19**	..	..	..	..	..	·24
SUNDRIES.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Coals cost per ton	**0 6·70**	2 9·52	**0 4·63**	..	0 7·19	**0 4·99**	**0 4·77**
Coke realized per ton of coal	0 2·94	0 1·92	0 2·37	0 11·33	0 2·18	0 9·77	0 10·09
Coke ,, ,, ...	0 7·25	0 9·35	**0 3·91**	1 4·60	0 0·67	0 10·19	1 5·70
		Per Yard.				Per Yard.	Per Chal.
Breeze ,, ,, ...	0 3·41	0 1·07	**0 1·59**	0 10·97	**1 6·43**	0 0·71	**0 7·77**
Tar realized per gallon	0 0·26	0 0·29	0 0·83	0 0·74	0 0·93	0 0·57	0 0·81
Amm. liquor, &c., realized per butt . . .	0 2·63	1 1·39	1 3·91	**1 9·45**	0 5·61	0 7·74	1 3·11
Percentage of stoves at rental to consumers . .	6	3	1	..	1	2	5
Bad debts per cent. on total receipts . . .	**·06**	**·02**	**·05**	**·04**	**·01**	..	**·06**
Net profit per cent. on ordinary capital . . .	**·24**	**2·53**	·63	**2·19**	**·17**	1·90	1·68
One penny variation equals in half year . . .	£1675	£699	£84	£465	£78	£50	£351
Carb. water gas per cent. on total make . . .	2·80	..	5·32	6·89	8·50	7·86	4·22

Home Beet Sugar Industry.—The decision of the Government to withdraw from the Sugar Convention will (the "Daily Telegraph" says) mean a "prompt termination of the efforts to establish a beet industry in this country. There will be no further inducement to continue the experiments which are being made; and the farmers in Norfolk and Suffolk will not bless the day when they were persuaded to plant several thousand acres with beet. The factories in Norfolk and in Cornwall, now nearing completion, will be quickly shut down; and we shall have one more shining example of the Government's attitude to home industries."

ELECTRICITY SUPPLY MEMORANDA.

Electricians Patrons of Poor Cooking Establishments—A "Delico" Alliance—The Electrical Contractors' Fresh Victory—The Tale of the City—Lighting Green Lanes.

ARE electricians in the habit of patronizing for their daily food caterers who cannot afford to keep proper cooks on the premises? If we are to believe a writer in the "Electrical Times," he at any rate appears to be particularly addicted to this sort of thing. He may be a penurious, miserable sort of individual; and these characteristics may impel him into the by-ways where cheap and nasty food products are dispensed to the poor, and those who are niggardly. An article has lately been published in the contemporary named, headed "Another Electric Restaurant," and reference is made in the course of it to pictures illustrating the article. The illustrations show a few trifling electrical heating appliances up one corner of each of two rooms which have very much in common; and there are also depicted some dishes displaying food to which we defy anyone but those who had seen the originals to put a name. This is how the black patches on the dishes are described by the electrical writer: "Even the unavoidable loss of detail sustained in the reproduction cannot disguise the appetizing appearance of the food displayed on the counters. There is a welcome absence of burnt pastry, dried-up meat, and shrivelled vegetables, such as one is accustomed to see, and forced to eat, with gas-cooked food in the ordinary restaurant." When the writer of these words in our electrical contemporary is *compos mentis*, he might make another inspection of the pictures to ascertain if they actually do justice to his descriptive powers, or whether his descriptive powers do not exceed the tale of the pictures. The fact that many of our most famous caterers cook solely by gas, and yet the writer of the article is forced to eat burnt pastry, dried-up meat, and shrivelled vegetables, and that he is accustomed to such things, all goes to show that (if he is writing the truth) he is in the habit of patronizing places where the art of cooking is not a high accomplishment. Not only are the restaurants wrong that this miserable person supports, but he is equally unfortunate, in his selection of tea-shops. Those of which he professes to have knowledge are ruining the digestions of the people who frequent them, entirely owing to the cooking methods in vogue. Then why do the people frequent them? Why do the shops continue to exist, to flourish, and to multiply? Is it that the imagination of the electrical writer has again come into conflict with truth, and that the places flourish because the public experience does not confirm the imaginative products of such electrical penmen, or is it that the first notion is the true one, and that wretched parsimonious habits lead to places where the art of cooking is not yet properly known?

About the new electrically equipped restaurant. It is the Delico Restaurant in James Street, W.; and it seems to have been named and christened the "Delico" long before electrical cooking appliances found place in it—when some other cooking means of greater thermal value was the vogue. The establishment is run by the London Home Delicacies Association; and the Association seems to be large debtors to the Marylebone Electricity Department. Electrical appliances evidently require highly cultured experts—such experts as the Association employ—to see that they are used and treated properly. There has been much said about Messrs. Debenham and Freebody's electric kitchen—Mr. Debenham being a prominent member of the Marylebone Borough Council. The electrical equipment in the Debenham kitchen is equal to cooking for 500 employees; but the London Home Delicacies Association run the kitchen under contract for the firm, and pay the current bill. The London Delicacies Association ran the electrical cooking department at the Smoke Abatement Exhibition. On the Committee who had the direction of this section, Mr. Seabrook, of Marylebone, had a prominent place. The London Delicacies Association run the "Delico" Restaurant; and the Marylebone Electricity Department has equipped it. "Although at present the whole of the cooking is not carried out electrically, it is only a question of time before no other system is employed." We see from these facts that the Home Delicacies Association and the Marylebone Electricity Department are on very intimate terms; and the alliance is certainly very useful for keeping Marylebone and Home Delicacies prominently in print—chiefly electrical. On what terms are the Home Delicacies Association supplied with current for their various enterprises? The article is headed "Another Electric Restaurant." Are we supposed to emphasize the first word?

There are people in Sheffield who are taking very ungraciously the decision of the House of Lords, that henceforth trading by the Corporation in electric wiring and fittings is only to be *viâ* the electrical contractor. These people are chiefly to be found in the City Council Chamber and in the Electricity Department. Some of them do not appreciate exactly where the decision has placed the Corporation. There appears still a feeling in certain quarters that, if the appeal against the judgment of Mr. Justice Swinfen Eady (which litigation is said to have already cost the Corporation £2000) is persisted in, and the case won, this will put the Corporation into proper legal position. These people have yet to learn that a decision of Parliament in 1912 will abrogate all previous powers actually possessed by the Corporation in the direction to which the decision applies. Nor is there anything to be gained now or hereafter by anyone connected with the Corporation indulging in such bellicose language as this: "If the contractors of Sheffield or any other city think a small Committee composed of Lords of the Realm are going to stop all municipal progress, they are living in a fool's paradise." Far is it also from the intention of the irate writer of these words to recognize that Parliament has begun to see that there must be limitations to municipal activities. He asserts that "Parliament has done nothing of the kind. It is a small Committee of the House of Lords that endeavours to wreck municipal progress." It is little use in the first flush of anger being stiff-necked, and refusing to recognize certain patent facts. Parliament has considered that there should be some limitation to municipal trading powers; and attesting this are several instances of stoppage or limitation of profit appropriations and borrowing powers. Another point that may be said to be more correct in theory than in practice is the denial that the Corporation are in "active competition" with the electrical contractors. There are many thousands of pounds' worth of work that annually goes through the municipal department that would no doubt pass through the hands of the contractors if the municipal wiring and fitting trading department did not exist. Therefore, if the expression "active competition" is objected to, it can with propriety be said that the Corporation wiring and fitting department forms such an effective barricade that the contractors cannot make much impression upon it.

Our electrical friends are a very discontented lot. They are not in the frame of mind for acknowledging that there is something in the old maxim "Live and let live." The "Electrician," commenting on the annual report of the City Engineer (Mr. Frank Sumner), remarks: "Electrical engineers can scarcely rest content with the arrangement reached last November for the apportionment of the lighting [of the City] between the electrical and gas companies." Electrical engineers generally, we are afraid, have not much say in the matter. The City Corporation are the predominant party; and the gas and electricity companies serving the City are not negligible quantities, and these quantities in the arrangement came to the conclusion last year that there was precious little in the lighting for either of them if their competition led to any further curtailment of prices. Therefore the electrical engineers who are not content with the arrangement will have to continue to chew the cud of discontent in company with the "Electrician." This contemporary also points out that Mr. Sumner reports that the number of defective electric-lamps reported during the year was 81; the total number of lamps in use being 470. The "JOURNAL" is accused of not forgetting to lay stress on these failures, but altogether omits to mention that no fewer than 1973 defective gas-lamps were reported during the year. To this our contemporary adds that, "as the total number of gas-lamps was 2648, it will be seen that the electric-lamps were relatively more than four times as reliable as the gas-lamps." The "Electrician," in its anxiety to make a point, has not penetrated very deeply into the facts disclosed by Mr. Sumner's report. Let us ascertain what these facts are. In the first place, the 81 defective electric lamps, it may be taken, were arc lamps of an illuminating power of (electrically stated) glorious magnitude; the 470 electric lamps in the City only including 46 metallic filament lamps. The 1973 defective gas-lamps referred to were all in the 2518 small low-pressure lamps. How many of these small side street gas-lamps ought to be allowed to completely fail to equal the failure of one arc lamp? That is one aspect of the matter. There is another. Very few of the defective gas-lamps were "failures." The 81 defective electric lamps were failures; for Mr. Sumner says: "For these *failures*," deductions were made amounting to £13 2s. 7d. Regarding the defective gas-lights, Mr. Sumner points out that 1909 were feeble lights—not complete failures. Only 62 were failures; and 2 were lamps that were not lighted. From the point of view of "failures," will the "Electrician" explain how the electric-lamps with 81 extinctions were relatively four times as reliable as the gas-lamps with 62 extinctions? Will it also point out that the electric-lamp-hours in the City last year were only 2,021,000, as compared with 11,386,400 gas-lamp-hours, without taking into account in either case the days of fog? Reference to the days of fog will suffice by mentioning that the 2648 gas-lamps—high and low pressure—were lighted in the City during the year on 54 foggy days at an additional cost of only £404 9s. 7d., while the lighting of the 470 electric-lamps on only 43 foggy days cost £330 17s. 3d. If desired, we will excuse our contemporary from referring to this comment, as the question of electric-light failures—wholesale as well as occasional single ones—is, we realize, with them a delicate topic.

The Southgate District Council have had before them the momentous question of lighting Green Lanes, which appears, despite the rural appellation, to be a main thoroughfare in the district. The Council have come to a decision to adopt 213 metallic filament lamps each of (so-called) 80-candle power, of which lamps about one-half are to be extinguished at midnight in accordance with the Electric Company's tender of £2 15s. per pair of lamps and £1 7s. 6d. per single lamp per annum. We have no further particulars before us than these; and therefore we do not know if these figures are intended to include capital, maintenance, renewals, and labour. These things can never be judged from electrical figures, as some electrical authorities are prepared to make almost any sacrifice to get a part of the public lighting. If the capital expenditure, for instance, is not included, the Council had better inquire at Hampstead as to the actual cost of installing electric street lamps, as there the cost came to £10,000

or so more than the estimate of the borough electrical officials. We do not know that the lamps proposed for Green Lanes are actually of 80 British candle power, or whether they are, as many filament lamps are, of the German unit. There is no suggestion that they have been photometrically tested; and we do not know the number of hours they are to be alight per annum. All we have in a report of a meeting of the Council are such vague statements as one by Mr. Councillor Holmes, that "in the position in which gas was, it would not give as good results as electric light, which was cheaper;" and the equally enlightening statement of Mr. Cosgrove that the matter had been decided on the points of efficiency and cost. That is splendid. Upon efficiency and cost, gas won the last Westminster contract, as it has done the more recent contracts at Doncaster, Guildford, and Bournemouth. Why not at Southgate? What does Mr. Cosgrove understand by "efficiency"? Does he take the mere candle power assigned by the electricians; or does he take into account such facts as these: In the tests made in Holborn by the Borough Council officials, they found that modern gas-lamps of lower candle power than the electric lamps gave a higher illuminating power down the centre of the roadway; in Hampstead and Marylebone, many of the metallic filament lamps have had to be replaced by lamps of higher candle power, because of the discontent of the residents with the lamps compared with the old gas-lamps; on every hand, among disinterested men competent to pass judgment, there is the knowledge that incandescent gas-lamps have a greater penetrative power in fogs and mists. These are points that bear on the question of public lamp efficiency; and there is another one. Mr. Cosgrove said continuity of supply would be provided for in the contract—if a filament failed, it would be immediately attended to. Is that the failure of the artificial lighting that has to be most dreaded in a main thoroughfare? The failures that have to be considered are those that plunge an entire main street in darkness, when at the height of busy times, through a fault that may arise anywhere between the electric generating-station and the street-lamps. Light for light, efficiency for efficiency, cost for cost (even with electricity at 1d. per unit), metallic filament lamps cannot beat the modern inverted gas-lamp. The Southgate councillors had clearly made up their minds, despite all argument, to have metallic filament lamps. That this was so is plain from the vaguely stated grounds on which the defence of their choice is made. We will not go so far as to say that certain of the councillors have only shown a sort of bucolic intelligence over the lighting of Green Lanes; but we will with confidence assert that they have not a complete grip of the facts.

INSURANCE ACT AND GAS WORKERS.

Position of Employees of Sub-Contractors and of Supervisors.

We have received from Mr. R. W. Edwards, the General Manager and Secretary of the Aldershot Gas, Water, and District Lighting Company, copies of correspondence which has passed between him and the National Health Insurance Commission, in regard to the payment of an employer's contributions for workmen employed by sub-contractors on piecework, and also to two of the higher officers of the Company.

Mr. Edwards, on the 12th ult., wrote to the Commission to the effect that the Company have a man employed at the gas-works who is engaged in unloading coal, and is paid at the rate of 1½d. per ton. He, in turn, employs what labour he may require, in respect to which all the following points apply: (1) Power and control, (2) power to select and appoint, (3) power to dismiss, and (4) liability to pay wages or other remuneration. Mr. Edwards said his opinion was that the Company were only liable to pay in regard to the man himself, who would be responsible for, and pay in respect of, the men employed by him. Mr. Edwards also wrote with regard to the Chief Superintendent and the General Foreman at the works. Both of these men are engaged in work of supervision and not manual labour, and each has a gross wage of over £160 per annum—in each case including the value of a house rent free. He assumed, therefore, that the Company would not be required to pay in respect of these two men; and he said he should be glad to have a confirmation of his opinion on this and the other point.

In due course, he received a reply to his letter, as follows: "Regulations have been made under Schedule III. (6) to the National Insurance Act providing that when, in a factory or workshop, workers are under the general control and management of the occupier, but are not immediately employed by him, the occupier of the factory or workshop shall be treated as the employer, and be responsible for paying contributions in respect to such workers. In such case, the occupier will be empowered to deduct the worker's (but not the employer's) contribution from sums payable to the immediate employer, who, in turn, will be entitled to recover from the worker. An employed person whose rate of remuneration exceeds £160 a year is not required to be insured under the National Insurance Act, unless he is engaged in manual labour."

Additional Decisions by the Umpire.

Among the recent decisions of the Umpire under the Insurance Act contained in the last number of the "Board of Trade Journal" are the following: Contributions are not payable in respect of workmen described as gas stokers, employed during most of the year as stokers at a gas-works, and part of the year as labourers in the works and yard, assisting in the overhauling, cleaning, and repairing of plant and apparatus, provided they are not employed wholly or mainly on repairs to buildings or machinery; persons employed in the manufacture of billiard tables, fittings, and accessories, including the manufacture of gas and electric fittings for them, but not including the installation of gas and electric light in billiard-rooms.

CULTIVATING THE ELECTRICITY BUSINESS.

Misrepresentation at Stockton-on-Tees.

Discussion is proceeding at Stockton-on-Tees regarding the improvement of the lighting of the secondary schools. By gas this can be accomplished with an illuminating power of four times more than the existing system at a reduced cost; while electricity to give the same illuminating power would work out to many shillings per hour more. The exact figures will no doubt be published in due course; and if we come across them, they shall appear in our columns. Meantime we protest very emphatically against the scandalous use that is being made of statements, on behalf of electricity, that are absolutely without any scientific foundation, and with the use of which any man with an elementary acquaintance with chemistry and physics would be ashamed to be identified.

In the first place, whoever has been guilty of sending out the type-written extracts before us no doubt knows well the condemnation there has been of metallic filament lamps on account of their high intrinsic brilliancy. Even an electrical engineer of the status of Mr. W. M. Mordey, a Past-President of the Institution of Electrical Engineers, has spoken of the "whiplash" of the fine incandescent filaments of these lamps upon the eyes. Many other students of illumination subjects have protested against their use without there is positive protection of the eyes from the filaments. If there are eyes that should be scrupulously defended from the action of lights of high intrinsic brilliancy per unit of filament area, it is the eyes of the young in schoolrooms; and school authorities have a very serious responsibility in this connection.

One of the circulars reprints a comment on the annual report of the Chief Inspector of Factories for the year 1909; and, if we mistake not, we have seen this comment before—in one of our electrical contemporaries! Why does this assailant of gas lighting, whoever he is, appeal to a factory report of 1909, when the report for 1911 shows a distinct change of tone on the part of the factory inspectors, and even recommendation of incandescent gas-lights for factory purposes. Furthermore, the meanness that underlies this reference to the three-year old factory report is clear from the fact that the person who is making use of the (we believe) pirated extract would have those to whom it has been addressed believe that the conditions existing in factories are similar to those of secondary schools. Another type-written extract is headed "A Sliding-Scale of Asphyxiation." A more contemptible misuse of a statement has never been seen. The figures, but not the accompanying statements, are attributed to Professor Marchant of the Liverpool University. They give the consumption of gas by out-of-date burners, and one Welsbach burner of 3·5 cubic feet per hour consumption. Dr. Marchant is stated to have said that the quantity of oxygen required for the complete combustion of this quantity of gas per hour is 4·1 cubic feet; and he is also attributed with the statement that the "vitiation" of the atmosphere produced by a gas-burner of this kind is equal to that of three adult persons. Now modern science has shown that the term "vitiation," as applied to the gas-burner, is a misnomer; and scientists who have made investigation into these matters have proved that the quantity of carbon dioxide produced by the combustion of gas is perfectly harmless. It is, in fact, a "bogey," to use a term employed by Sir Ray Lankester, and so long as the percentage of oxygen in the atmosphere is not reduced below a point at which combustion is sustained, there is more oxygen in the atmosphere than suffices for human requirements. Moreover, the gas-burner assists in keeping the atmosphere in motion; the electric lamp does not. The natural action of drawing air in and expelling warm air at the top, with plain ventilating openings near the ceiling of the room, are the very conditions (the ideal conditions) that contribute—especially in a schoolroom—to hygienic conditions. Neither Dr. Marchant nor the person who sent out these type-written circulars would be prepared to deny that these natural conditions do not obtain; nor would either of them care to scientifically demonstrate that the organically charged carbon dioxide exhalations of the human person are to be compared with the pure carbon dioxide of the gas-burner.

Then there is a scandalous misrepresentation in one of the type-written circulars as to the loss of the candle power of the gas mantle in comparison with the Osram lamp. We have inverted gas-mantles that have been in use since March 2 last; and these have not depreciated in candle power 5 per cent. But, in the figures in the type-written slip before us, it is stated that a mantle, giving 85-candle power at the start, lost 40-candle power in 440 hours! Is this the sort of calumny and misrepresentation that the electrical industry hopes to secure custom on? This particular circular has at the foot the statement: "These figures can be

easily substantiated." Very well. If the Stockton-on-Tees Gas Department knows the person who sent out this statement, the Department should really make him "substantiate" the statement, and, if he cannot do so before competent witnesses, cause him to withdraw it in the same manner as that adopted in giving it circulation. The ancient sayings of Dr. George Carpenter are resuscitated for service. More modern science has shown the errors of the "knowledge" in this connection of the Dr. Carpenter of long years ago. But as this person at Stockton-on-Tees who has distributed these circulars has adopted Dr. Carpenter as an authority, perhaps he will kindly tell us how it is, and why it is, that sulphuretted hydrogen is a product of the combustion of gas. We ought to have inserted "not" after is; but there is a desire to gain an indication as to the personal knowledge of these matters of the individual (if this article should meet his eye) who depends upon such ancient misstatement and rubbish as appear in these type-written papers for securing an extension of business. The pity of it is that a business like electricity supply, and educated men, should need to have recourse to such methods in the endeavour to make commercial headway.

We fancy it would be easy to also place, with a fair amount of certainty, our hands upon the author of a statement headed "The Ventilating Fallacy." It has been seen before, or something very much like it; and the foolish words have done duty in other places than Stockton, but they have never succeeded in displacing fact.

COMMERCIAL GAS COMPANY.

THE following is the report for the six months ended June 30 which the Directors of the Commercial Gas Company will present at the half-yearly meeting on the 22nd inst.

The revenue account shows a net profit for the half year of £73,097 13s. 10d., which, added to the balance of £61,500 3s. 2d. brought forward from the previous half year, produces a net revenue balance of £134,597 17s. Deducting £8519 17s. 10d. for interest, there remains standing to the credit of the net revenue account a balance of £126,077 19s. 2d. available for dividend. The Directors recommend the payment of dividends at the rates of £5 9s. 4d. per cent. per annum on the 4 per cent. stock of the Company, and of £5 6s. 8d. per cent. per annum upon the 3½ per cent. stock, both less income-tax. The balance of the net revenue will be carried forward to the next half year.

WILLIAM GRAHAM BRADSHAW, Chairman.

Aug. 6, 1912.

The accounts accompanying the report consist of the usual set of statements. They show that the paid-up stock on the 30th of June amounted to £996,405; that £1,076,875 had been added by conversion, making £2,073,280; and that £149,298 remained unissued out of the total authorized capital (including premiums) of £2,235,000. The total amount borrowed on the above-named date was £339,062 10s., and £135,937 10s. was added by conversion; making a total of £475,000, and leaving £79,226 to be borrowed out of the £550,000 authorized. Capital account receipts amount, with premiums, to £2,606,065 4s. 5d. The expenditure stands at £1,449,264 16s. 7d., with a nominal amount of £1,212,812 10s. added by conversion—together, £2,662,077 6s. 7d. There is thus a balance of £56,012 2s. 2d. carried to the balance-sheet. A sum of £1497 was expended during the half year on freehold property, new and additional mains, services, &c.; but as £2696 is credited for stoves, prepayment meters, and fittings, the total expenditure on capital account to the 30th of December last is reduced by £1199. The reserve fund amounted at the close of the half year to £37,729, and the insurance fund to £33,616. The following is the

REVENUE ACCOUNT.

Expenditure.

Manufacture of gas—			
Coal and oil, including dues, carriage, unloading, and trimming	£79,829 17 2		
Salaries of Engineer and officers at works	3,054 10 2		
Wages (carbonizing)	10,780 14 11		
Purification, including labour	1,734 19 4		
Repair and maintenance of works and plant, materials and labour (less £271 15s. 2d. received for old materials)	32,827 13 3		
		£128,227 14 10	
Profit sharing		3,522 3 3	
Distribution of gas—			
Salaries and wages of officers (including rental clerks)	£5,196 16 3		
Repair, maintenance, and renewal of mains and services, material and labour	8,289 16 8		
Repair and renewal of meters	2,633 17 6		
" " " " stoves	10,955 9 1		
" " " " prepayment meters and fittings	12,061 9 6		
Incandescent mantle maintenance	785 8 8		
		39,922 17 8	
Public lamps—lighting and repairing		2,641 5 6	
Rent, rates, and taxes		16,150 6 10	
Management—			
Directors' allowance	£1,250 0 0		
Company's Auditors	75 0 0		
Salaries of Secretary, Accountant, and clerks	1,031 18 7		
Collectors' salaries and commission	1,688 1 3		
Prepayment meter collection	3,254 5 4		
Stationery and printing	1,433 5 6		
General charges	1,994 10 0		
		10,727 0 8	
Bad debts		386 0 1	
Law and parliamentary charges		433 14 2	
Superannuations and allowances		1,785 4 6	
Official officers, &c.		138 11 4	
Total expenditure		£203,934 18 10	
Balance carried to net revenue account		73,097 13 10	
		£277,032 12 8	

Receipts.

Sale of gas—			
Per meter (No. in use, 108,183) at 2s. 4d. per 1000 cubic feet	£189,569 6 5		
Public lighting and under contracts	5,624 16 10		
	£195,194 3 3		
Less discounts and allowances	5,258 16 2		
		£189,935 7 1	
Rental—			
Meters (23,772)	£2,860 4 1		
Stoves (68,595)	10,927 1 1		
Prepayment meters (83,663)	15,771 2 1		
Incandescent mantle maintenance	791 18 0		
		30,350 5 3	
Residual products—			
Coke, less £3437 1s. 11d. or labour	£32,144 9 8		
Breeze, less £960 1s. 7d. for labour	1,370 1 1		
Tar	11,719 11 5		
Ammoniacal liquor and sulphate of ammonia	11,445 13 2		
		56,679 15 4	
Miscellaneous receipts—			
Rent receivable	£28 5 0		
Transfer fees	0 0		
		67 5 0	
Total receipts		£277,032 12 8	

The following statements relate to the manufacturing operations :—

Statement of Coal and Oil.

—	In Store Dec. 31, 1911.	Received During Half Year.	Carbonized During Half Year.	Used and Sold During Half Year.	In Store June 30, 1912.
	Tons.	Tons.	Tons.	Tons.	Tons.
Coal	25,371	78,483	83,478	855	19,521
Oil—gallons	670,499	1,286,913	1,665,417	..	291,995

Statement of Residual Products.

Description.	In Store Dec. 31, 1911.	Made During Half Year.	Used During Half Year.	Sold During Half Year.	In Store June 30, 1912.
Coke—tons	6,420	52,174	5,542	51,507	1,544
Breeze—tons	3,373	8,156	..	8,709	2,820
Tar—gallons	429,385	1,112,075	..	1,047,990	493,470
Ammoniacal liquor—butts of 108 gallons	8,183	27,525	29,759	..	5,949
Sulphate of ammonia—tons	230	945	..	1,030	145

Statement of Gas Made, Sold, &c.

Quantity Made.	Quantity Sold.		Quantity Accounted for.	Number of Public Lights.
	Public Lights and under Contracts (estimated).	Private Lights, per Meter.		
Thousands.	Thousands.	Thousands.	Thousands.	
1,788,484	36,521	1,626,478	1,689,826	3902

The remaining statement is the balance-sheet, which gives the value of the stores in hand at the close of the half year as follows: Coal, oil, &c., £15,496; coke and breeze, £1209; tar, ammoniacal liquor, sulphate of ammonia, &c., £10,635; sundry stores, £34,806—total £62,146. The figures this time last year were: Coal, oil, &c., £20,007; coke and breeze, £1144; tar, ammoniacal liquor, sulphate of ammonia, &c., £6584; sundry stores, £30,923—total, £58,658. A sum of £21,444 stands in the balance-sheet as employees' bonus and savings, compared with £20,370 at the end of June, 1911.

American Association of Water Departments.

We learn from "Engineering Record" that in May last the Chief Engineer of the Department of Water Supply, Gas, and Electricity of New York City (Mr. I. M. de Varona) sent a letter to the Water Department of each city of the United States having a population of more than 200,000, asking their consideration of a proposal to form an Association of the chief engineers and superintendents for mutual benefit through a closer contact between these departments and greater co-operation among them. The problems which face the technical directors of the water-works of large cities are so varied, and the details are frequently so important, that this interchange of information and opinions suggested by Mr. de Varona is meeting with a very favourable response. The organization of the new body is simple—the only officer proposed being a secretary, elected for one year, and not eligible for re-election until after two years in the ranks. All expenses are to be borne by him, and the meetings are to be held in the city where he has his office. The main features of the work of the Association, as suggested in the preliminary circular, are the exchange of annual and half-yearly reports and statistics, data on water-waste, organization diagrams, forms used in carrying on work in watersheds, pumping-stations, and distribution systems, rules and regulations governing fire hydrants and fire-protection arrangements, and standardizing materials used and methods followed in water-works systems. The purpose of these suggested subjects for consideration is to bring about, so far as possible, an automatic exchange of information, long before this can be done by printed reports, between those large cities which, by reason of their size, present substantially the same problems in administration and engineering. The very hearty approval with which the proposal has been greeted seems, our contemporary thinks, to ensure its successful execution.

COOKING BY GAS AT HOTELS.

Large Externally Heated Gas-Ovens, with Grills and Hot-Closet, at the Langham Hotel—New Structural Features.

THE culinary department of a large hotel may be said to be at the very base of its reputation and success. The Langham Hotel, Portland Place, W., can lay claim to being second to none in London in ministering to the pleasures of the table. In the spring of this year, the demands on the kitchen of the hotel necessitated a considerable extension of the cooking arrangements; and selection had to be made from coal, gas, and electricity apparatus. There was at first a leaning towards electricity. It was in the mind of the hotel's accomplished chef (M. Fetu) that what he more specially required could not be done by gas; but he was open to conviction. And the Gaslight and Coke Company convinced him and the hotel management that the special requirements could be met, by their particular commodity, better, cheaper, and with greater reliability than by electricity. In an hotel, time, reliability, and prompt changes of temperature are important factors both in the kitchen and in the maintenance of the table reputation of the place, and absolute economy, important though it be, has, under the circumstances, to come after. For electricity to have attempted to meet the cooking requirements of such a place as the Langham Hotel could only have ended in failure.

The satisfaction that, before obtaining the contract, the Gaslight and Coke Company gave M. Fetu, that they could carry out his requirements to the letter, has been more than fulfilled in the performance; and now for upwards of three months, the gas equipment, with its novel features, has been in use, and has given unbounded gratification to the chef and his staff, who find that in every part it responds to their wishes with perfect freedom. Nothing more, nor anything better, could any chef require.

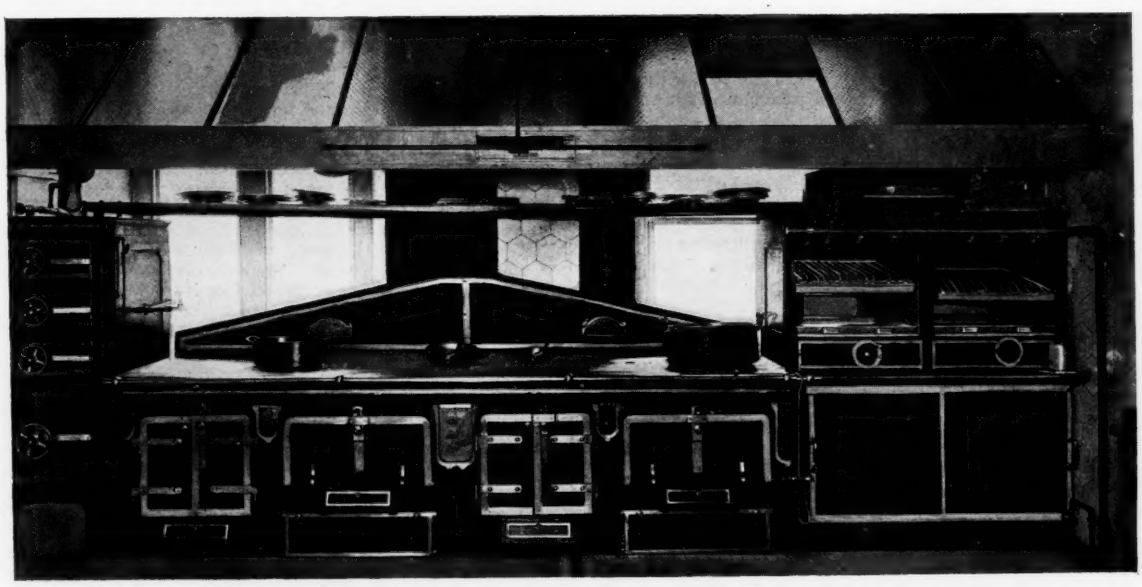
There were four main features in this cooking installation that were required by M. Fetu—

(1) That the top of the range should be perfectly flat, so that the utensils—for boiling, stewing, simmering, and so forth—could (without lifting) be pushed along to meet high or low temperature according to requirement.
(2) That the ovens should be externally heated.
(3) That the whole equipment should be well ventilated.
(4) That the grilling arrangement should be such that the grills could be raised and lowered without withdrawal, and to any degree desired.

In collaboration with Messrs. Fletcher, Russell, and Co. (who undertook the work of construction), the Gaslight and Coke Company met these conditions successfully in every respect.

The complete installation has an over-all front length of 17 ft. 2 in., of which length the externally heated gas ovens and range claim 10 ft. 8 in., the hot closet 4 ft. 6 in., and the vegetable steamer (heated by live steam) 2 feet. The range is 2 ft. 10 in. high and 3 feet deep. The four-compartment vegetable steamer is seen on the left-hand side of the illustration; and it need not claim further attention—the principal interest being found in the range and grill.

Taking the range first, the top of this is flat and entirely closed; this being preferred to the open top by chefs who have to deal with



The New Externally Heated Gas-Ovens and Hot-Closet, with the Grills, and Other Cooking Equipment at the Langham Hotel.

cooking utensils which are heavy with their contents. In the rapidity with which work has to be done in such places as hotels, it is easier to slide these utensils about than to have to exercise great care in lifting and transporting them by hand from place to place, according to the temperature required. The top of the range is constructed of seven thick and weighty steel plates. Strength and substance were required to withstand the strain of the temperatures to which the plates are exposed, and the weight of the utensils they have to carry. The main part of the plate is of $\frac{3}{8}$-inch thick steel; with an under rim which makes the plate on its outer edge about $\frac{3}{4}$-inch thick. Now we cannot imagine the heating of these plates to the varied temperatures required—with the loss by radiation and conduction that must go on under such conditions—being economically accomplished by electric energy; and thinner plates would certainly not stand the strain of the work, nor afford a sufficient storage of heat. The reasons that the tops were made of seven plates were in order that a small, but sufficient, allowance could be made for meeting expansion and contraction, and that there should be easy manipulation of parts when cleaning. Should one plate crack, too, replacement is an easier matter than dealing with the whole top of such a range.

Under each of three of the plates, there is a large gas-ring and two long straight burners. Over the gas-ring, a circular opening is provided, which by the aid of two circular rings and a centre piece can be made of three diameters, or be completely closed-in—the opening allowed being according to the size of the vessel to be heated, so that there shall be no escape of heat and no naked flame. The gas-burners are removable for cleaning. The intermediate top plates have under them three long straight burners; and as each burner has its own tap fixed along the front of the range just below the guard-rail, it will be seen what a tremendous range of temperature has been provided for on this top plate, without any complication, and with a simplicity, reliability, and durability that defy competition. Any temperature that is wanted can be obtained; and the utensils can be shifted about to varying temperatures just as the chef requires. The hot-plate is a distinct part of the range, and is unconnected with the ovens.

Turning to the ovens, there are two for roasting and two for baking—those for roasting having double, middle opening doors, and those for baking drop doors, with rest projections, so that, as they are lowered, each forms a shelf for facilitating the withdrawal of the food. The latches of the doors are interesting. They are vertical slide bolts, with double grooved catches at the top, so that the doors can be fastened quite tight or slightly open for the emission of steam. The ovens for roasting are 20 inches wide, by 18 inches high by 28 inches deep internal measurement, and those with drop doors are 27 inches wide by 12 inches high, by 28 inches deep. The burners are situated beneath the ovens; each oven having its own lighting-door and burners, so that the temperatures are perfectly controllable. The heat passes externally up the sides of the ovens to the back; and the products of combustion travel to a shallow collecting-flue at the back of the top plate, to be presently referred to. The ovens have fire-brick bottoms. The taps for the oven-burners have a recess provided for them at the top right-hand side of each door; and the sunk plates are removable for giving attention to the taps. It will be seen from this that every detail has had consideration, in this range of several novel points.

It was stipulated that the whole of the range and top-plate should be ventilated from end to end. There were structural difficulties in the kitchen; but they were successfully negotiated. A sloping glazed canopy covers in the whole equipment; and from the canopy a flue leads to an existing permanent shaft. The products of combustion from the externally heated ovens and from

the enclosed hot-plate are collected in shallow flues at the back, which deliver into the flue from the glazed canopy. The canopy also collects the fumes arising from the cooking; and these also find exit by the flue.

A plate-rack extends from the vegetable-steamer to the hot-closet and grills, in connection with which there is found further interest. This hot-closet is 4 ft. 6 in. wide by 2 feet deep; and it is also externally heated. The two large grills above the hot-closet have their special interest. The heat is derived for each grill from three long burners, each with a double row of jets, impinging on to fire-brick above. The grills are fluted (with a gravy trough suspended in front); and they slightly slope from back to front. But M. Fetu wanted to escape from the form of grill that demanded pulling out and pushing in when the subjects of his art were being cooked by this mode; and he wanted, too, to dispense with the fixed ledges at the sides, which do not allow the precision of adjustment that grilling demands. His wishes have been accomplished by winding gear; and by the mere turning of a handle in front, he can raise and lower the grills for the inspection of the cooking food, or raise and lower them by several or less inches or the fraction of an inch just as he desires.

While on this work, the Gaslight and Coke Company have reorganized the outside lighting of the hotel—putting up new lanterns of a design that harmonizes with the general outer decorative scheme, the lanterns being fitted with high-power low-pressure inverted burners. The lighting at night time is excellent; and the metallic filament lamps in the neighbouring street-lamps look gloomy in comparison.

A GERMAN TEXT-BOOK ON PHOTOMETRY.*

THE comprehensive work on "Photometry" which is now before us has been partly written by Herr F. Uppenborn, who was Corporation Surveyor of Munich until his death on March 25, 1907. The manuscript which he left unfinished was put into the hands of Dr. Berthold Monasch, of Augsburg, for completion and elaboration. The result of this unpremeditated collaboration of two of the most distinguished authorities on electric lighting is a volume which gives succinctly all that is of importance in regard to the photometry of electric lamps, as well as the principles of photometry in general. Moreover, the methods of gas photometry in vogue in Germany and the testing of incandescent gas mantles are briefly dealt with.

The book is divided into eighteen chapters. The fundamental character of the treatment given by the authors to their subject will be realized from the fact that the first chapter is physiological, and describes the construction and working of the human eye, which necessarily is an indispensable adjunct in all measurements of light. The chapter also discusses the Purkinje phenomenon, the sensitiveness of the eye to different colours, and the effect of ultra-violet and ultra-red on the eyes. We think the author does not emphasize sufficiently the necessity for thorough filtering, through suitable screens, of the light from metallic filament electric lamps, if injury to the eyes is to be avoided. The reality of the harmfulness of the unscreened or unfiltered light from such lamps has been brought home to the general public through the report on their proposed use for lighting the debating chamber of the House of Commons, made by Mr. E. Treacher Collins, the eminent oculist. ["JOURNAL," Vol. CXVIII., p. 660.]

The second chapter of the work refers to Lambert's cosine law and the assumptions implied in it. The statement and explanations of the law are followed by observations on diffusion and the diffusive power of different surfaces. The third chapter states the photometric dimensions and units which were adopted by the German electricians and gas engineers in 1897, and gives their relation to the units accepted in other countries. With regard to the so-called "international" candle, the resolution of the International Photometric Committee at its sitting at Zürich last year is quoted as disposing of that term for the time being. M. Blondel's objection to the use of the word "candle" to designate the unit of light, because it primarily refers to a material object, is mentioned sympathetically. The alternative of "pyr," which M. Blondel advocates, does not, however, appear to us to find much favour among photometricians.

The fourth chapter describes primary and secondary standards of light. The definition of the English standard spermaceti candle, as given, includes a specified height of flame (44·5 mm.), which needless to say is no part of its true definition. But German photometricians have persisted for many years past in naming a specific height of flame for the English standard candle, and have manipulated the wick, when using the candle, in order to obtain a flame of the height named. As a consequence, quite erroneous values have been found by them for the average light of the English spermaceti candle in terms of the Hefner unit or German standard paraffin candle, the definition of which does specify a normal height of flame. The authors continue to give Liebenthal's factor for correcting for the effect of variations of atmospheric pressure on the light of the Hefner lamp, instead of the factor deduced from more recent and exhaustive investigations by Butterfield, Haldane, and Trotter. A number of standards of light which have been suggested from time to time are briefly referred to; but the list includes neither the Dibdin pentane standard nor the Elliott petroleum lamp. Various electric glow lamps are described as secondary standards.

The fifth chapter shows the relation between intensity, flux, and mean illuminating power for different sources of light and different extents of surface. The sixth chapter discusses the effect of reflectors and globes. The distribution of the radiation is much more fully considered in regard to arc lamps than incandescent gas lights, both in this and in the following chapter, which relates to illumination. The authors naturally favour the electrician's view that illumination is adequately judged merely by the average illumination of a horizontal plane a metre above ground level; but they state the opposite views of Drehschmidt and Krüss, who consider that the illumination of vertical planes also should not be disregarded. The latter position is held also by numerous English gas engineers, who see no reason why a system of measurement which glosses over the defects of electric arcs as ordinarily applied for street lighting should be accepted by them. In regard to the lighting of rooms, the authors ignore the inverted gas-burner, which complies more nearly than any electric light or oil-lamp with the ideal requirements which they set forth. But they say a good deal about indirect lighting, which in practice is a subterfuge by which electricians endeavour to secure from arc lamps the uniformity of distribution of light which inverted gas-burners naturally afford, and to avoid the glare and flickering which are otherwise inseparable from the use of arc lamps. It is further significant of the authors' treatment of the relative merits of different illuminating agents that, in a comparative tabular statement of the specific consumption per lux and square metre, they quote numerous figures for different types of electric lamps obtained by tests made in the years 1910 and 1911; whereas for gas-burners only one figure quoted has been obtained subsequent to 1907, while the majority of the figures are considerably earlier. Thus the recent advances in the efficiency of gas lighting are ignored, while the most modern types of electric lamps are included in the table.

The eighth chapter deals with fixed laboratory photometers. The early types of photometer heads or photopeds are briefly described. But the modern adaptation of Foucault's principle by the Metropolitan Gas Referees is not mentioned; and the Lummer-Brodhun contrast photometer, with all its defects, is given pride of place for accurate work. Stigler's observations, which show that a binocular is more accurate than a monocular photometer, are, however, quoted; and Kruss's binocular modification of the Lummer-Brodhun photometer head is described. The ninth chapter treats of portable photometers, for the measurement of both intensity and illumination. A short chapter on mirrors follows, and then angular photometers are dealt with. Integrating photometers, such as Blondel's Lumenmeter and the Ulbricht Globe, form the subject of the twelfth chapter. The thirteenth is a long chapter on the comparison of lights of different colours. We may remark incidentally that in the section on flicker photometers in this chapter there is given a very useful bibliography of the literature thereon. A short chapter on attempts to devise an absolute photometer by the use of selenium comes next.

The fifteenth chapter should be one of the most interesting to readers of the "JOURNAL," since it is headed "The Photometry of Gas." So far as determinations of illuminating power are concerned, however, it merely quotes the prescriptions issued by the German Association of Gas and Water Engineers, as revised in 1905. The determination of the calorific power of gas is also described, for the reason that the International Photometric Committee, in its session at Zürich last year, expressed the view that the determination of the illuminating power of gas flames had ceased to be of importance, and the calorific power had become the most important criterion of the value of gas. The treatment of gas calorimetry by the authors is, however, limited to quoting the stereotyped German description of the Junkers calorimeter (old pattern) and the mode of using it. The chapter concludes with rules suggested by the Photometric Committee of the German Gas Association for the testing of mantles; but these rules are so old that they contain no reference to inverted mantles and burners, to which many of the directions given are quite inapplicable. It will thus be seen that the authors' ideas of the photometry of gas carry them no farther than the quotation of more or less antiquated semi-official German prescriptions for making a few routine testings. Such perfunctory and unintelligent handling of gas photometry is not in keeping with the treatment accorded to other branches of their subject by the authors, who, in our opinion, should either have secured the collaboration of a competent gas photometrist or have refrained from any attempt to deal with gas testing, with which obviously they have had no experience.

By way of contrast, their handling of the testing of electric glow lamps and of arc lamps, in the next two chapters, is most masterly, and leaves nothing to be desired. Thus the book ends well, and, as a whole, may be safely recommended to anyone requiring a modern treatise on the principles of photometry and the testing of electric lamps. It is only when they stray on to the unfamiliar ground of gas testing and gas-burners that the authors betray any want of competence to act as authoritative guides, not merely to the student, but also to the practitioner of photometry.

* "Lehrbuch der Photometrie," von Friedrich Uppenborn, weil. Stadtbaurat in München. Nach dem Tode des Verfassers bearbeitet und herausgegeben von Dr.-Ing. Berthold Monasch. Mit 254 in den Text gedruckten Abbildungen. R. Oldenbourg, Munich and Berlin, 1912.

GASLIGHT AND COKE COMPANY'S CENTENARY.

A STORY IN FIGURES.

[COMMUNICATED.]

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INTRODUCTION.

THE history of the Gaslight and Coke Company, who have just celebrated the centenary of their Charter, is too voluminous to be written in chapters. Space will only enable the story to be told in figures; and yet a few words are necessary to introduce the subject-matter.

The Company commenced operations in 1810, and at the time of receiving their Charter, in 1812, had a capital of only £200,000. They were looked upon as a visionary enterprise, and were a butt for the sarcasm of the learned as well as the ignorant. The privileges of their Charter were neither liberal nor encouraging; the powers being moderate and the restrictions many. For many years, not much was done in the practical application of gas as a lighting agent; and just as the promoters were losing heart, they were fortunate in securing the services of Clegg as their Engineer, who surmounted, by his untiring energy and genius, the obstacles that lay in the path. Prejudice had to be eradicated, and established habits altered—upon which only time could have any telling effect. The apparent slight that had been thrown upon this new branch of civil engineering doubtless kept many sensible and well-disposed persons from joining to make it a success; but from this time the story of the industry and that of the Gaslight and Coke or the "Chartered" Company, in particular, has been one of rapid advance, as the following figures will show.

EARLY HISTORY AND SOME COMPARISONS.

As an evidence of the small beginnings from which the "Chartered" Company sprang, it may be mentioned that the area of the Company's territory in 1812 was but 10 acres; while to-day the area is one of over 120 square miles in extent. The Company's capital of £200,000 has risen to about £30,000,000; and while they started with a coal carbonization at the rate of 4000 tons per annum, they have now an equivalent of 2¼ million tons of coal carbonized annually. The rateable value of the concern at the start was £150 10s. 4d. During the present year of grace, it is a trifle over £300,000; while 1d. reduction in the price of gas (small as it may appear) on the 25,484,985,000 cubic feet annually sold would represent a sum of about £100,000.

During the first decade of the Company's existence, progress was very difficult, owing to the want of a competent engineering head. Leaky gasholders, the absence of any dividend until 1817, the want of a means of measuring the amount of gas sold to the consumers, and the abuse by the consumers of the then system of charge—"gas rental" per burner—and the consequent ill-feeling generated between buyer and seller as to the amount used, caused these years to be very lean indeed. To add to the troubles of the Company, competition sprang up. In 1817, The "City of London" Gas Company was inaugurated; the "Imperial" Company in 1820; and by 1823, there were no less than four Gas Companies supplying on the North of the Thames. In 1815, Winsor, the founder of the Company, who, though possessed of boundless energy, yet lacked the practical application necessary for the realization of his great schemes, withdrew from the Company, and retired to Paris on a small pension.

The advent of Samuel Clegg as Engineer and adviser to the Company at this juncture proved a turning point in the history of the concern, for he lifted it out of the rut into which it had fallen and laid the lines for its advancement in the future. The perfecting of the gas-meter by Clegg in 1825 (which he had invented in 1815) solved one of the great difficulties of the Company. Progress now seemed assured; and in 1823, Sir William Congreve, Inspector of Metropolitan Gas-Works, stated that the danger from storage and works "is not so great as has been supposed," and praise is found taking the place of abuse. The 6000 cubic feet limit for gasholders fixed by the Royal Society is removed; and at this date the Company have 122 miles of mains, with 30,735 lamps in lighting, carbonizing 20,670 chaldrons of coal, and producing 284,000,000 cubic feet of gas. The "Independent" and the "London" Gas Companies were started between 1828 and 1830; and in addition to this opposition, the Company had to fight the London and Westminster Oil Gas Bill before Parliament, which a Special Committee of the House finally rejected after a lengthy inquiry. In 1826, the Company relinquished their mains and rights of lighting on the Surrey side of Westminster Bridge in favour of the "Phœnix" Company.

AGREED AREAS.

From 1823 to 1848 opposition ceased through "agreed areas" being assigned to the Companies by Sir William Congreve (known as the "Congreve Compact"). On May 11, 1830, F. A. Winsor died in France. In 1833, "The Lighting and Watching Act" came into force, to enable local bodies throughout the country to light their districts, and is still in force. But it is so full of out-of-date restrictions that it has often the opposite effect to what was intended; and at times it indefinitely postpones the lighting of country districts. Its repeal, or amendment, is now necessary. In 1847, an important piece of legislation was passed affecting all gas companies throughout the kingdom—viz., the "Gas-Works Clauses Act."

1848 TO 1860—UNRESTRICTED COMPETITION.

In 1849, with gas at 6s.—the price having gradually come down from 15s. since 1823—the Company had to encounter further opposition by the starting of the "Great Central Gas Consumers" Company in the City, under the auspices of the Corporation, led by Mr. Charles Pearson (the then City Solicitor), and Mr. Alexander Angus Croll, Sheriff of London, who became Engineer to the Company, with works at Bow Common. The Company was incorporated in 1851. This Consumers Company, born of a body of aggrieved ratepayers, started with a promise of a free meter and service, and gas at 4s. per 1000 cubic feet. In addition to the above-mentioned privileges, many other inducements were offered. The consumers in the area were plied with literature of a bombastic character, the Press also taking up the matter, while meetings of citizens were held to ventilate their grievances. District inspectors had full powers and a free hand (including a commission) to get customers the best way they could—not new customers, it may be here mentioned, but "turnovers" from the other Companies. Competition was now universal—four or five Companies supplying one district. This competition was disastrous. The Companies rarely paid anything like full dividends; and the provision of the 1847 Act was, that when full dividends were paid (viz., 10 per cent.) a reserve fund of one-tenth of the capital was to be accumulated. After that, any further surplus was to go in reduction of price. The Act allowed companies to make up their dividend deficiencies out of earlier years; and so full dividends were practically assured by the legislature. The price of gas was not reduced, nor was it likely to be under such conditions. During 1847, the price was about 6s. 6d. per 1000 cubic feet. Most of the Companies paid less than 6 per cent., with the exception of the Imperial Company, who were in the happy position of paying 10 per cent. With competition so very rife, and so many companies supplying one area, the consumers were the only ones to reap any benefit—and this often of an unscrupulous kind, by obtaining gas for years without any payment whatever. A nominal deposit would induce a rival company to lay a supply—often three services were in one premises. Dishonest customers could thus take advantage of the secrecy observed by the rival companies, to obtain their light free. Concessions of every kind were made to obtain patronage, even to allowing several lights to be supplied free of charge, the company altering fittings gratuitously, while gas would often be supplied at one third the sale price.

A customer obtained, a meter would be left. A week later, another company would undertake to supply by "contract," with the addition of free lights. Then, as the mains of the three companies were side by side, it was not an unusual occurrence to find a company drawing payment for gas taken from an opposition main. This was not the only source of loss; for in addition—in consequence of the hurried manner in which mains were often laid, and continual changing of service-pipes—large escapes took place, swelling the total of "unaccounted-for gas." It was difficult to bring to book the offending company, as officers threw responsibility upon their rivals; and in the event of a leakage being discovered it was not unusual to attribute it to wilful damage on the part of a rival's workmen.

The spirit of competition, in fact, reached the point of personal animosity among directors and officers of the various gas undertakings. Explosions were the order of the day, owing to hurried main and service laying—each company making the most of its rivals' troubles.

The Great Central Consumers' Company had a clause to reduce the price of gas to 3s. 6d. and afterwards to 3s. per 1000 feet as soon as the consumption would enable the Company to make the reduction out of the "excess of profits" after paying a dividend of 10 per cent. Needless to say, the Company never got below 4s.—finding it impossible to combine the low price with a profit on its working. They had power to pay deficiency in dividends in previous years that were below 10 per cent.; and they were not compelled to form a reserve fund.

The period of supply between the passing of the Gas-Works Clauses Act, 1847, and the Metropolis Gas Act, 1860, was one of unrestricted competition. In 1848, the price of gas was 6s. per 1000 cubic feet all over the Metropolis.

During this period of "unrestricted competition," the "cheap gas" agitation spread south of the Thames—Mr. Croll and Mr. John Thwaites, a draper in the Borough (afterwards Sir John Thwaites, the originator and first Chairman of the Metropolitan Board of Works), being the prime movers. Sir George Livesey, speaking of these times, said: "I was then a lad, at the Old Kent Road Works, under my father. My advent into the gas industry was in 1848; and I remember quite well as a youngster attending a public meeting and hearing these gentlemen speak. They demanded a reduction from 6s. to 4s. If the companies had been reasonable and reduced it 1s. to 5s., I think it would have stopped the agitation; but they were obstinate and persisted in the 6s."

The result of the agitation was the starting in South London of the Surrey Consumers' Gas Company by Messrs. Croll and Thwaites. This Consumers' Company started likewise with the promise to supply at 4s.; and shortly afterwards it fell to that price all over London.

It is scarcely necessary to point out that the roadways were continually being torn up during this competition period. The competition between the Chartered Company and the Central

Consumers' Company for the public lighting in the City of London in the years 1850 and 1852, caused 1650 and 1903 holes in the pavement respectively in that small area alone. To put an end to this destructive competition, "districting" was commenced in 1857 on the Companies' area, though not sanctioned by Parliament. In 1859, the "Sales of Gas Act" came into operation to compel meters to be officially tested.

Districting.

The year 1860 was an important one for the Company, as it saw the birth of the Metropolis Gas Act, which had for one of its objects the permitting of "districting" which killed competition. It fixed a standard price of 4s. 6d., and allowed the selling price to be raised on appeal to 5s. 6d., and fixed the illuminating power of the gas at 12 candles. At this time there were thirteen Metropolitan Companies.

In 1862, the Court of the Company were fortunate in securing the service of Mr. John Orwell Phillips as their Secretary (to quote the records), "under whose masterly sway that policy of consideration was achieved which, through temporary and comparatively trivial sacrifices, has conduced to the lasting welfare both of the Company and the consumers whom it serves. It is not too much to say that under Phillips, the Chartered Company rose from the position of a second-rate Company to rank as the first and largest in the world."

The years 1865 and 1866 saw a recrudescence of discontent on the part of the public and local authorities for a restriction of the powers and an increase of the obligations of the various Companies supplying the Metropolis. The Corporation of London, the Metropolitan Board of Works, and the Board of Trade combined in this agitation; and the "Daily News" especially supported the agitation by carefully written articles and leaders suggesting the starting of a Municipal Gas Supply for the Metropolis; and in 1866, the City Corporation, who had spent large sums in promoting Bills and in Gas Legislation generally, had a Bill in Parliament authorizing them to become the Gas Authority for the City of London, with works at North Woolwich. This Bill, which was considered by Sir John Trollope's Committee, came to nought.

Amalgamation.

In 1867, a further Committee of the House, under Mr. Cardwell, suggested amalgamation as the best means of satisfying both the public and the Companies, with a periodical revision of price by the Board of Trade. The Companies would not take the Committee's recommendations, relying on their parliamentary right of a 10 per cent. dividend. The Committee therefore urged that the local authorities should have powers of supply granted them. This 1867 Bill brought in by the Board of Trade contemplated fixing a maximum price of 3s. 6d. for 14 candle gas, and limiting the dividend to 7 per cent. where this price was charged, with a sliding-scale for increasing the dividends when the price was below the maximum fixed. This might have been termed a "one-way" sliding-scale. When, however, the Bill came before a Committee, the Companies offered 4s. as a maximum price for 14-candle gas. This was an improvement upon the 4s. 6d. and 12 candles of the 1860 Act. But as at the time no company was charging more than 4s. it was not much of a concession. In fact, the Imperial Company were only charging 3s. 9d. The Companies then came forward with their Amalgamation Bill. This fell through; and 1868 saw the passing of the City of London Gas Act, permitting amalgamation. Then the Great Central Consumers' Company and the City of London Company passed over to the Chartered Company. This lead to the closing of the City Company's works on the Thames at Blackfriars. The City Gas Act of 1868 set up a supervision by Board of Trade auditor, the Gas Referees, Chief Gas Examiner, and Gas Examiners. The closing of the City of London works, and the refusal of Parliament to sanction a site near Victoria Park, brought the Company before Parliament the same year, asking power for the erection of new works at Barking, in Essex. The site was afterwards called Beckton—after Simon Adams Beck, the Governor of the Company at that time. In 1870, gas was made at Beckton by the Company; and the City of London Gas Company and the Great Central Gas Consumers' Company were "officially" amalgamated. The year 1871 saw the absorption of the Equitable Gas Company and in the same year the Victoria Docks Gas Company allowed itself to be purchased. 1872 saw the retirement of the Company's eminent engineer, Frederick John Evans, after 35 years' service. This year also saw the last of the Western Gaslight and Coke Company—passing like the other Companies North of the Thames under the sway of the Chartered Company. This last amalgamation brought to the Board of the Company the late Governor, Colonel Sir William T. Makins, Bart. This year, the Company obtained powers to raise an additional million of capital to meet the cost of still further amalgamations and extensions.

About this time (1872), the "Iron Stoker" or "Iron Man" had just been introduced into gas-works; and at the close of the year, the stokers of the Company, in spite of an announcement by the Directors of an additional 10 per cent. on their "already handsome rate of wages," left work without any warning, with the idea of putting London in darkness. But by obtaining gas from other Metropolitan Companies, and the loan of workers from the City Corporation, the Board of Works, the Police, and the Company's contractors, the design was defeated, but not without costing the Company some £30,000. In 1873, the Company were in Parliament, consolidating their 1868, 1870, and 1871 Acts, and for power to "purchase and use collier ships, lighters, vessels, &c."

In 1875, the site of the Company's Blackfriars works were sold to the Corporation of London for £170,000—thus assisting in the formation of the Victoria Embankment. This year saw a further stride dear to the heart of Mr. Orwell Phillips—viz., amalgamations, by the absorption of the "Imperial" and "Independent" Companies who gave up separate working in the year 1876. Gas was also ceased to be made at the Westminster works this year. The year 1876 was an important one in the history of the Company, following as it did Mr. W. E. Forster's Parliamentary Committee of 1875 on the Bills introduced into Parliament by the local authorities against the London Companies owing to the increasing prices that were being charged for gas. This resulted in the 1876 Act being passed, by which the "sliding-scale," "auction clauses," and a "standard price" of 3s. 9d. were introduced into the Company's Act; the authorized capital being fixed at £8,265,000. There was also a standard dividend of 10 per cent., which could be raised 5s. per cent. per annum for every penny taken off the price per 1000 cubic feet of gas. The 10 per cent. was to be reduced proportionately if the Company increased the selling price beyond 3s. 9d. The selling price of the Company at this date was 3s. 6d., and by the year 1880 it had come down to 3s. 4d.

The year 1879 saw the Company again in Parliament seeking powers to "apply capital to the purchase and manufacture of engines and apparatus . . . to sell or let on hire, with the object of encouraging the use of gas during the day as well as by night, for cooking, warming, &c." In 1870, Mr. F. J. Evans, the Engineer and Designer of Beckton and Chief Technical Adviser to the Board, passed away after 43 years' service. This year, the Company had to pay a sum of about £20,000 in compensation, owing to the Tottenham Court Road gas explosion.

In 1883, the last of the amalgamations of the old Metropolitan Gas Companies took place—viz., the London Gas Company, whose area was partly on the north and partly on the south of the river, in the Strand and Lambeth respectively, with works at Nine Elms—after long negotiations; the date of the Order in Council being May 22, 1883. Thus the Company got astride the river; and this was the beginning of uniformity of prices north and south of the Thames for public lighting to local authorities—a clause having been inserted which compelled the Company not to charge a higher price for gas of the same candle power in their newly-acquired southern area than that of the neighbouring Company. This was extended to all public bodies north of the Thames for the purpose of public lamps.

From 1880 to 1889 the price of the Company's gas gradually fell from 3s. 4d. per 1000 cubic feet to 2s. 6d.—the lowest price it has ever been sold at. According to Sir Courtenay Boyle, "After 1889 the Gaslight and Coke Company had a tendency to increase (in price), owing to labour troubles and increase in price of coal."

The year 1889 saw the abolition of the coal dues by Lord Randolph Churchill. This was a due of 1s. 1d. per ton on all

Relative Area of Supply by the Three London Companies in 1898-99.

Company.	Capital and Borrowed Money, &c.	Area. Square Miles.	Population.	Rateable Value (1899).	Consumption per Mile of Main.	Customers per Mile of Main.	Public Lamps per Mile of Main.	Received for Public Lighting (1899).	Income from All Sources.	Net Profits.	Gas Sold (1897).
	£			£	Millions.			£ s. d.	£ s. d.	£	Millions.
Gaslight and Coke .	28,000,000*	62¾	2,389,000	25,666,000	10¼	156	26	153,055 11 10	3,838,405 3 6	1,022,232	21,022
South Metropolitan .	7,748,486*	52	1,320,000	7,534,000	10	177	24	65,056 16 1	1,452,621 18 4	333,507	8,844
Commercial . . .	1,044,017	6	470,000	2,120,000	8½	109	20	20,282 2 9	389,858 1 2	97,205	2,341
Totals . . .	£36,792,503	120¾	4,179,000	£35,320,000	—	—	—	£238,394 10 8	£5,680,885 3 0	£1,452,944	32,207

* Converted.

It will be seen from the "Income from All Sources" that the Gaslight and Coke Company's receipts equalled about 32s. per annum from every man, woman, and child on their district; while that of the South Metropolitan Company was about 22s., and of the Commercial Company 16s. To decrease the price of gas 2d. per 1000 cubic feet at this date equalled a sum of about £180,000 to the Gaslight and Coke Company on their area north of the Thames alone.

N.B.—The only area in the southern district approximating to the Gaslight and Coke Company was the Croydon Gas Company, with 72 square miles. Since then, the Gaslight and Coke Company have added 57¼ square miles to their territory by amalgamation—viz., West Ham Company, 12¼ miles, and the Barking and Chigwell Companies 45 miles; making a total of 121 square miles.

seaborne coal coming into London—9d. of which went to the Metropolitan Board of Works and the remaining 5d. to the City Corporation, for the purpose of metropolitan improvements. This 1s. 1d. per ton represented £145,000 to the London Gas Companies in 1889. In the same year, carburetted water-gas plant was first installed at Beckton. In 1893 Mr. J. Orwell Phillips retired, after having served 31 years as Secretary and General Manager, and Mr. John William Field, late of the Imperial Company, was appointed in his place.

In 1894, the Company introduced automatic prepayment meters into their district; bringing a useful commodity within the easy reach of the humblest.

The year 1895 saw the abolition of meter-rents by the Company. This represented a sum of £60,000 per annum to their consumers, or ¾d. per 1000 cubic feet of gas sold.

In 1898, the Company consolidated their capital by Act of Parliament.

In 1899 and 1900, there was a great rise in the price and dearth of coal, which prevented any decrease in the price of gas.

In 1900, the Metropolis Gas (Prepayment Meter) Act was passed.

The Pimlico works of the Company were sold in 1902.

In 1903, the Company obtained an Act to redeem obsolete capital, &c.; and the standard price was reduced from 3s. 9d. to 3s. 4d. In the same year Mr. D. Milne Watson became General Manager, and Mr. Henry Rayner Secretary; and in 1905 Mr. Goulden was appointed Chief Engineer to the Company. The London Gas Act, which accounted for the abolition of the sulphur tests, came into operation this year.

In 1906, Sir William Makins died, after having served on the Board forty years, for twenty-three of which he had held the post of Governor. Mr. Corbet Woodall succeeded him to the high office of Governor, and inaugurated a school of handicrafts for apprentices, who are taught the practical and multifarious details of the Company's business.

In 1907, the Company felt it right to reimpose meter-rents, excepting in the area of the City of London, which is especially exempt. In this year, Mr. Ulick J. Burke, who was a Director of the Imperial Company and the Gaslight and Coke Company for a period of 39 years, was elected Deputy-Governor. The year 1909 was, from the employees' point of view, a most interesting one, in the inauguration, by the Court, of their co-partnership scheme, by which 9000 employees have been taken into the confidence of the Board, given a portion of the privileges, and have elected to share in the responsibilities of the undertaking.

In the same year (1909), the Company purchased the West Ham Gas Company, by parliamentary sanction—thus acquiring an additional territory of about 12¼ square miles. A calorific test was put into the Company's Act this year; and the illuminating power of the gas was reduced to 14 candles.

The St. Pancras works were sold in 1911, and the Company were again in Parliament seeking powers (successfully) to acquire the Barking Gas Company and the Chigwell, Loughton, and Woodford Gas Company. These acquisitions gave an additional area of about 45 square miles to the Company.

The present year finds the Company selling gas at the cheapest price it was ever sold at—viz., 2s. 6d. per 1000 cubic feet. The capital has grown to £30,000,000, and the output of gas to 25,484,985,000 cubic feet.

The following table shows the growth of the Company in gas output during five decades:—

	Cubic Feet.
1871	3,183,777,000
1881	12,169,636,000
1891	19,232,716,000
1901	21,160,142,000
1911	25,484,985,000

Note.

1812	Gas-rental charged, competition.
1823 to 1848	Agreed areas, Congreve compact of 1821-3.
1848 ,, 1860	Competition.
1860 ,, 1868	Districting.
1868 ,, 1883	Amalgamations.
1883 ,, 1912	Statutory monopoly.

1812, capital £200,000; 1912, £30,000,000.

Tarred Roads in Massachusetts.—There has lately been presented to the Highway Commission of Massachusetts a report by the Chief Engineer (Mr. Dean) on the construction of roads in the State. In the course of it, he makes the following remarks as to the use of tar: "Ordinarily, where the tar is employed for a binder, it is used in one application of approximately 1½ gallons to the square yard, on top of the second course of stone. Some expense is saved in the first cost of a road built with tar, in that it saves a second handling of the stone in the second course; this course being spread as in an ordinary water-bound macadam road. After it has been partially compacted by rolling, refined tar is applied by a pressure distributor, followed by an application of half-inch screenings—the whole being then thoroughly rolled and compacted. The reason for the difference in the method of applying oil and tar as binders is that oil penetrates upward as well as downward, whereas tar has a tendency to penetrate largely downward. Tar has not been used very extensively by the Commission, for the reason that it appears to disintegrate under atmospheric action much more rapidly than asphalt products. This disintegration may be prevented, and the life of the material prolonged, by applying annually a thin surface of refined tar."

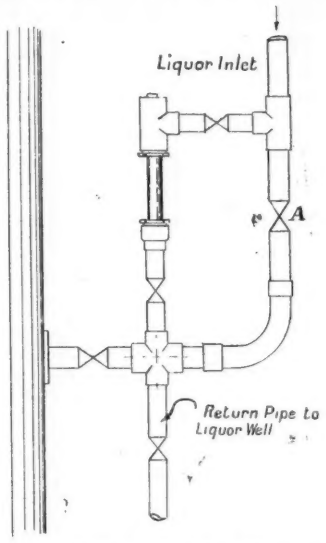
NOTES ON THE WORKING OF A SULPHATE OF AMMONIA PLANT.

[Communicated.]

Although the size and capacity of sulphate of ammonia plants in gas-works vary to a considerable extent, there are certain points in the working which are common to both large and small plants, and to which attention must be paid if the best and most economical results are to be obtained from the materials and apparatus employed. The usual method of stating the make of sulphate of ammonia as being so many pounds per ton of coal carbonized really gives very little indication as to the manner in which the sulphate plant is doing its work, and depends more upon the properties of the particular coal made use of and the carbonizing system employed. In many gas-works the old-fashioned intermittent process is still in use; and experience seems to show that this type of plant will give as efficient results as the more elaborate continuous processes. In fact, the chemical operation of producing sulphate of ammonia is so simple that it is attention to the small details which is conducive to successful working rather than elaboration of plant.

Liquor.

Perhaps more important than the plant itself are the materials which are to be used for the production of the sulphate—namely, the liquor, sulphuric acid, and lime. If a good white, high-testing salt is to be made, then these materials must be clean and as free as possible from foreign matter. This particularly applies to the liquor; and with the modern form of closed saturator, it is most essential that there should be almost entire absence of suspended particles of tar and light oils. In this type of saturator the froth



containing the tar and dirt cannot be skimmed off; and, consequently, it forms a hard crust on the inside, which ultimately causes stoppage. If the saturator is found to be letting-by ammonia to the outlet, the trouble can usually be traced to the formation of this crust; and when once this has occurred, the only course to take is to shut-down and thoroughly clean out the plant. It is useless to attempt to dissolve the crust in the hope that the dirt may be expelled through the ejector.

In most cases the liquor is fed to the plant from an overhead tank; and it will be found that there is no more effective filter than a piece of cocoa-nut matting wrapped into a cylindrical shape and passed over the top of the outlet pipe, which should preferably come up through the bottom of the tank to a height of about 18 inches. It is an additional advantage to be able to inspect the liquor just before it arrives at the plant; and a sight-tube arrangement—such as that shown in the sketch—forms a simple and ready means of doing this. Even should there be only a few particles of tar or dirt, these can be readily noticed and run back to the well by opening the bye-pass.

The sight-tube merely consists of a piece of specially hardened glass of 2 inches bore and 9 inches long, through which the liquor passes on its way to the plant. The tube is made additionally secure by being tightly bound with wire-netting, and is capable of standing considerable pressure. It is inadvisable to make use of a longer tube or one having a greater bore than 2 inches, for in the former case fracture is more liable, and with a large bore the liquor passing through is rendered too opaque for the suspended matter to be satisfactorily seen. Moreover, should a greater quantity of liquor be required, it can be obtained by partly opening the bye-pass cock. This bye-pass makes provision for possible breakage of the glass and also for cleaning purposes, when the two cocks at each end of the tube can be shut off and the liquor allowed to run through the plain pipe. With reference to the cocks, it must be remembered that cast-iron is the only suitable material from which these can be made—gun-metal or brass will

not stand for long the ravages of the liquor. During the night, sufficient illumination is obtained from a gas-jet placed behind the tube.

Acid.

With regard to the presence of particles of dust, &c., in the acid, it is somewhat singular that these really have very little effect on the sulphate, unless, of course, present in large quantities. Moreover, it has been found that the colour of the sulphate is affected very little when a deeply coloured acid is used. Should, however, the acid contain a considerable quantity of suspended matter, this may be almost entirely removed by filtering through ordinary ballast which contains a fairly large proportion of coarse sand. When preparing a filter for this purpose, it is advisable to have a layer of screened sand about 3 inches deep at the bottom, and to fill up to a total depth of 9 inches with material gradually increasing in size. Moreover, when the filter is first put into use, or when it has been freshly filled, a stream of water should be allowed to run through for three or four hours, to wash out all superfluous sand and dirt and to settle down the material. This will prevent fine particles of sand from being taken through with the filtered acid.

Acid filtered in this way usually undergoes a slight drop in gravity; and, in addition to filtration, a certain amount of decoloration takes place, with the result that the filtrate is considerably improved in appearance. By further treating the acid with a small quantity of potassium permanganate, it may be rendered almost perfectly clear and colourless. A regular practice should be made of emptying all acid-tanks and thoroughly cleaning them out, and lead roses should be placed over the pipes leading to the saturator.

Best Conditions for Salt Making.

There are various opinions as to the actual gravity at which the saturator liquor should be kept in order to produce the best results. In general practice, however, it will be found that a strength of 58° Twaddel is the most satisfactory; and once the acid is properly regulated, it requires but little attention. It should be impressed upon the man in charge of the saturator that a gravity test is to be taken every half hour; and he should be made to chalk-up his results on a board provided for the purpose. It is essential that the gravity should be kept as uniform as possible; and it will be found to be of considerable advantage to have a special hydrometer made which gives a travel of nearly half-an-inch for every degree Twaddel, and which is only graduated between 55° and 60°. In this way the man can see exactly where he has to work to, and there is far less possibility of his confusing the figures. A hydrometer of this kind costs very little more than the standard type containing a scale of 30°, and may be purchased for about 5s.

Discoloured Salt and the Cause of its Formation.

When a saturator is working imperfectly, the derangement soon becomes evident, owing to its effect upon the quality and colour of the salt. Perhaps the most frequent cause of discoloration is neglect to watch the gravity carefully, with the result that it probably runs down owing to insufficiency of acid. The formation of blue salt is usually indicative of a somewhat considerable drop, for this colour is rarely produced when the gravity is higher than 54° Twaddel. What usually takes place is that the saturator becomes decidedly alkaline. And, meanwhile, the attendant, noticing the drop shown by his hydrometer, hurriedly turns on the acid cock at full bore in an endeavour to get back to normal conditions. But during the time the liquor was alkaline, the iron salts contained in the acid were combining with the cyanide compounds contained in the liquor, and producing ammonium ferrocyanide. To this an additional quantity of acid, containing more iron salts, is added, and causes the formation of Prussian blue from the ferrocyanide already produced. Even should this state of affairs have only lasted for a comparatively short time the results are somewhat alarming; for a very small amount of "blue" is sufficient to colour a considerable quantity of sulphate.

Local alkalinity in the saturator should be guarded against, although in many cases this will be found to be due to the manner in which the saturator is constructed. It can best be prevented by using an outside "cracker pipe"—such as Williams and Fenner's—having supplementary tubes, which distribute the ammonia equally round the periphery of the saturator. A twenty-four hours' test on the outlet pipe of the saturator will be found useful. In this way, it may be seen if any considerable amount of ammonia has been passing. A possible objection to such a test, however, is that when the alkalinity shown is very slight, it is liable to be due to pyridene contained in the liquor, and not to ammonia.

Yellow discoloration is often due to the presence of arsenic in the acid, and the subsequent formation of arsenious sulphide. A method adopted by some sulphate makers to get rid of this impurity was to introduce into the saturator a small quantity of tar, which absorbed the arsenic and formed a scum; the scum being then skimmed off. This treatment, however, is only practicable with the open form of saturator.

Red discoloration, which is seldom found, is undoubtedly the outcome of the formation of sulphocyanides when local conditions are favourable to them.

It is frequently noticed that when sulphate has been lying in the bin and exposed to the air for some days, the upper layers assume a peculiar yellow tint, although the salt as it left the saturator was perfectly white and in every way superior. The change is seemingly due to the fact that the saturator has been allowed to run-up in gravity, with the result that the percentage of free acid in the sulphate is unusually high. The acid, of course, contains a certain amount of iron salts, and the ferrous sulphate is oxidized into ferric sulphate on exposure to air; the latter salt accounting for the discoloration. To prevent this from occurring, acid should not be used which contains more than 10 grains of iron per gallon. In the same way, it is occasionally found that slight blue discoloration sets in after exposure to the air on the drying-floor. This change has been ascribed by Leriche to the formation of "Berlin white" which, on exposure to the air, is oxidized into Prussian blue; the latter giving the sulphate its noticeable blue tint.

With reference to the running-up in strength of the saturator, it must be borne in mind that sulphate of ammonia is soluble in sulphuric acid, and, consequently, if the gravity is allowed to run-up much higher than 60° the salt will not crystallize out freely, and will be difficult to dry. It is advisable to have a pressure-gauge fitted to the outlet of the saturator, so that any undue back-pressure may be noticed and receive immediate attention. It has been sometimes found that dirty sulphate, in addition to the causes already mentioned, is due to the excessive back-pressure in the outlet pipe driving back the devil-liquor into the saturator. In no case should this pressure be allowed to exceed 8 inches of water. Occasionally sulphate of ammonia is found to contain traces of ammonium sulphocyanide, which should be avoided, if possible, as it is a substance inimical to plant life. It may be tested for by adding a few drops of ferric chloride and nitric acid to a solution of the salt, when, if present, the solution will become blood red.

Percentage of Ammonia.

The percentage of ammonia in sulphate is, of course, an important factor, owing to the nutritive properties of the substance depending upon it. Low tests are frequently due to the salt being removed for use before it has been allowed to drain in the bin for a sufficient length of time. Should it, however, be necessary to pack a newly-made batch, it may be spread out over the floor of the store in as thin a layer as possible, when it will drain and dry far more quickly. The bin should be constructed with a proper self-draining floor, the upper boards of which must be periodically taken up and the crystals removed. Low tests are occasionally the outcome of impurities in the acid, such as silica and alumina, which are absorbed from the vitreous materials employed in the construction of the sulphuric plant. These impurities are of a spongy character, absorbing a large quantity of moisture, and undergoing no change as they pass through the saturator. Moreover, they do not yield up their moisture when exposed to the air in the drying bin.

Conclusion.

In conclusion, the writer would draw attention to the methods which are occasionally found to be in vogue at some of the smaller provincial works. It is a remarkable fact that, while every precaution is taken to carefully regulate the supply of liquor to the saturator, the acid is poured in at very intermittent intervals and, in quantity as much as a whole carboy at a time. The result is that at one period the liquor is exceedingly high in gravity; and in a short time these conditions are reversed for those of excessive alkalinity and low gravity. With such working it is, of course, impossible to expect good results, even from the most perfect type of saturator and the best materials. In cases of the kind a small overhead tank should be used; the carboy being emptied into this and the acid regulated to a steady stream by means of an earthenware cock. Another prevailing custom is that of pushing down a stick into the open front of the saturator; and the belief is cherished that it is time to commence ladling out the salt when the stick will stand upright in it. This, again, is an additional factor which goes to make a necessarily continuous process as intermittent and convulsive as possible.

Ammonia Production.—In the course of a report on the advances in fertilizers in the years 1909 to 1911 in the "Chemiker Zeitung," Dr. G. Wichern reviews modern methods for the manufacture of sulphate of ammonia. He mentions the direct processes of Koppers and Burkheiser, by which sulphate is obtained from coal gas without the employment of sulphuric acid; the sulphur of the coal being utilized to form the acid *in situ*. The author states that a saving of about 13s. per ton of sulphate is thus effected. Ammonia is also obtained as a bye-product in the manufacture of power gas from wet peat in producers. Haber produces ammonia synthetically by passing nitrogen and hydrogen at a temperature of 930° to 1020° Fahr. and a pressure of 200 atmospheres over a catalyzer, such as osmium or uranium. The process has been taken over and improved by the Baden Aniline and Soda Works, which is working it on a large scale. Serpet obtains ammonia indirectly by treating a mixture of alumina (bauxite) and coal at high temperatures with nitrogen. Aluminium nitride is thereby formed. It is decomposed by the addition of water, with the production of ammonia and alumina, which is again used in the first stage of the process. But little energy is required for this process, which is being exploited by the Société Générale des Nitrures, of Paris.

ADVANCES IN GAS LIGHTING IN 1911.

It is a pleasure to receive Professor Strache's record of the advances in lighting and in the gas industry for another year.* The initial volume,† relating to the year 1910, was so excellent a compilation that the fulfilment of the hope which it inspired that the ensuing year would be similarly dealt with will cause great gratification to gas men. We trust that Dr. Strache may be able, in the course of his busy career, to spare time and energy to continue the compilation through a long series of years. No other annual gas publication in the German or any language can compare with it in respect of the completeness, succinctness, and co-ordination of the record of progress in the gas industry and lighting which it presents.

The present volume, which comprises 128 large octavo pages, has been prepared at the request of the Austro-Hungarian Gas and Water Engineers' Association. The contents are arranged under about 45 headings, and the authority for each item of information is given, with references to current technical literature. There are also numerous cross-references under the several headings. It is impossible to review in detail the contents of a volume of this character; but we may say broadly that the apportionment of space to the various branches of the subject appears to be judicious and appropriate. Rather more than six pages are devoted to comparisons of different types of retort and chamber settings. A good deal of matter is quoted on photometry, especially in regard to the testing of the illumination of streets. There is some interesting information, which we do not recall having seen elsewhere, on an occurrence of natural gas in Hungary, and on projects for its utilization. Automatic lighting devices occupy several pages; and a great many comparative figures have been collected for the cost and hygienic aspects of lighting by gas and electricity.

Obviously there cannot in such a compilation be much matter which has not already been laid before "Journal" readers; but it is useful to have presented in a compact and convenient form the salient features of a year's work in connection with gas supply and lighting. It is also in some respects an advantage to have the matters occurring near home set out side by side with those of the more distant parts of the Continent by an author who is more closely in touch with the latter. The different view-point of Professor Strache leads him to present many things in a new light, which will generally prove instructive to English gas men.

* "Die Fortschritte des Beleuchtungswesens und der Gasindustrie im Jahre 1911." Im Auftrage des Vereines der Gas-und Wasserfachmänner in Oesterreich-Ungarn zusammengestellt von Professor Dr. H. Strache, Leiter der Versuchsanstalt für Gasbeleuchtung, Brennstoffe und Feuerungsanlagen an der k. k. technischen Hochschule in Wien, Rat des k. k. Patentamtes. Mit 47 in den Text gedruckten Abbildungen. R. Oldenbourg, Munich and Berlin; 1912.

† See "Journal," Vol. CXVI., p. 525.

FRENCH COKE SCREENING AND LOADING MACHINES.

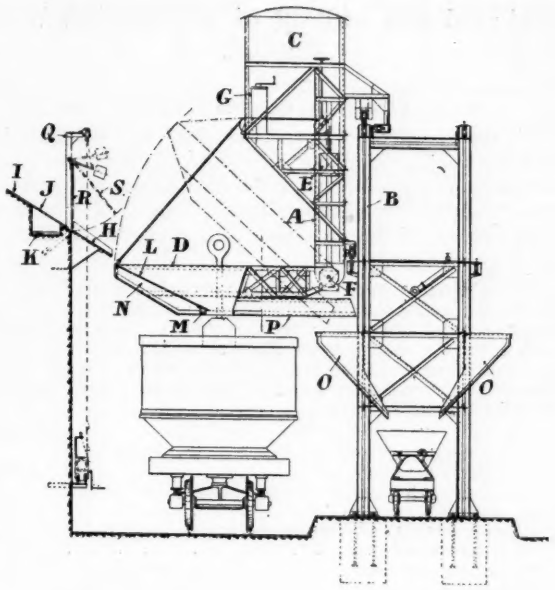
Patents have lately been taken out by the Société Française de Constructions Mécaniques and by Dr. C. Otto et Cie. for machinery for quenching and screening coke, and discharging it into waggons. The following particulars of the plant are translated from the French specifications.

The machine patented by the first-named Company consists of a travelling crane or similar appliance having oscillating flooring, and furnished with a grating to screen the coke and discharge openings for the lumps and small pieces. The flooring can be lowered so as to receive the coke direct from the place where it is drawn, and pass the lumps through the openings to suitable machines for handling it and the small pieces into a collector. In rising, the flooring runs the small coke through a shoot into a hopper, whence it passes to a machine of any suitable kind for dealing with it.

The accompanying illustration is a transverse elevation of a machine constructed according to the invention; the framework being arranged to support two machines for parallel settings.

The crane A runs along a track fixed upon the frame B, and operated by electric or other power from the workman's box C. At the lower part of the crane, an oscillating flooring D, balanced by the weight E, works on a pivot F; and the upward and downward movement of the flooring are effected by means of a winch G from the box C. The flooring when lowered to the full extent in the horizontal position, is opposite one of the fixed inclines H, which prolong the drawing floor I constructed in front of the settings. At the bottom of the floor is an openwork iron plate J and a passage for the discharge of the quenching water.

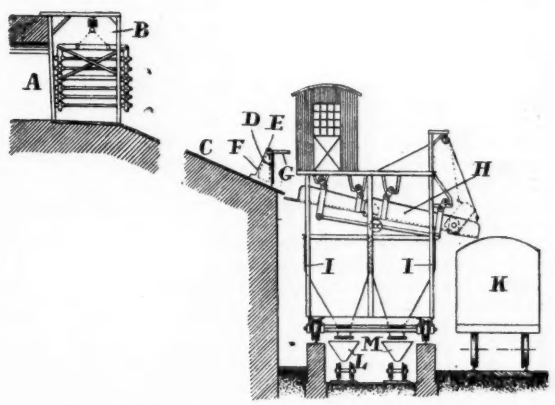
The floor D is provided with a grating L, inclined at approximately the same angle as the floor, and with or without a shaking motion. This grating screens the coke as it passes. An orifice M allows of the discharge of the screened coke into trucks or other vehicles moving underneath. The small coke which has passed through the grating accumulates in the collector N, which



is of adequate capacity. In the upward movement of the floor, this coke is discharged into hoppers O, running through a discharge passage made inside the floor, and communicating with the collector. To avoid all obstruction in the passage P, the floor can, when completely raised, impinge upon an elastic buffer, which pushes the coke down. From the hoppers the coke is carried away by trucks or conveyors. The drawing-floor is provided at the lower part with shutters Q, each pierced with a discharge opening R, which can be closed or opened at will by swinging or sliding doors S, easily worked. Those shown in the illustration are actuated with a winch mounted on a rolling truck.

The plant works as follows: The crane is brought into such a position that the floor D will be opposite the fixed incline H of one of the discharge openings R. The receptacle for the coke is brought under the opening M, and the door S is raised. The coke, following the incline of the drawing-floor, passes over the gratings in the floor D, discharges all the small into the collector, and immediately after screening is deposited in the receptacle for being dealt with. As soon as this is filled, the flooring is raised, and the small coke is discharged into the hoppers. The flooring is then lowered, and the machine is again ready for work.

The patent taken out by Dr. Otto et Cie. relates to a machine for quenching and screening coke, and conveying it into railway trucks ready for delivery. The accompanying illustration is an elevation of the machine.



A is the retort from which the coke is taken; B, the quenching shed; C, the inclined plane upon which the coke is conveyed to the machine; and D, doors closing the lower end of the plane. These are mounted in supports F, so as to pivot at E, and are provided with handles G. H is a screen connected with the lower end of the inclined plane. It stands on rails, on the frame I, so that a shaking motion can be given to it. The machine works as follows: When the coke is drawn from the retort, it is first conveyed under the quenching shed, and then runs down the inclined plane until it is stopped by the doors. The latter, which are preferably gratings, allow the water employed for quenching to flow away. When the coke is quite slaked and ready for loading, the door under which it must pass to the screen is swung open. The large lumps fall, from the vibrating screen, into the truck K, while the small pieces and breeze drop through the screen into the collectors L M.

TREATING GAS LIQUOR IN CONNECTION WITH SEWAGE.

Value of the Radcliffe Process.

This was the subject of a paper submitted to the Engineering Section of the Royal Sanitary Institute, at the Congress recently held in York, by Mr. REGINALD BROWN, Engineer and Surveyor to the Southall-Norwood Urban District Council. The following is an abstract of the communication, which, in Mr. Brown's absence, was not discussed.

The rapid extension of the principle of the bacteriological treatment of sewage led the author to ascertain what effect, if any, the discharge of gas liquor into sewers would have upon the ultimate treatment of the sewage at the disposal works; and for this purpose queries were sent to a large number of towns in England and Wales. Some 200 replies were received, and they were analyzed, with the following results:

	Per Cent.
Gas-works from which the untreated ammonia effluent is discharged direct into the sea	24·0
Gas-works which discharge the effluent into rivers or streams (non-tidal)	11·0
Gas-works which dispose of their effluent by allowing it to sink into the ground	6·5
Gas-works stated to use the effluent for quenching coke	3·5
Gas-works in connection with which the local authority were unaware, or did not state the method, of disposal adopted at the works	16·0
Gas-works which make ammonia waste effluent, but do not discharge it into the same district in which the local authority have sewers	6·0
Gas-works which discharge the effluent into sewers which, in their turn, discharge to purification works	33·0

The author proceeded to explain the nature of gas liquor and the process of its production, and pointed out that when it leaves the still it is of a yellow colour, but rapidly absorbs oxygen, and eventually becomes dark brown. Its injurious constituents are those connected with this oxygen-absorption, the antiseptic constituents, and the free lime added in the treatment of the original ammoniacal liquor; the most important probably being those first named. As the paper did not deal with the methods in use, except where the liquor is discharged into sewers, the author passed on at once to this part of his subject. He directed attention to the fact that the replies received to his questions showed that 33 per cent. of the works availed themselves of the sewers to dispose of their liquor. Of this number, the local authorities concerned with 26·5 per cent. of them replied with negative statement, while the remaining 6·5 per cent. made definite positive statements, as to the injurious effect of the liquor.

Before dealing with the damage, if any, to the provision made at the sewage-disposal works, the author referred to a valuable paper by Dr. Fowler and others, read before the Society of Chemical Industry, at Manchester, in December, 1910,* in which it is stated that ammonia-recovery liquor can be purified by bacterial filters without danger, so long as the volume of liquor bears a small proportion to the volume of sewage treated. The author said it should, however, be borne in mind that as gas liquor contains a very large proportion of oxidizable matter, it must have some effect upon the working of bacterial filters, if the latter are designed only of sufficient capacity to deal with sewage. In the majority of the instances from which negative replies were received, the sewage is either treated by broad irrigation, where a large area of land is available, or the percentage of the liquor to the sewage is small; or else the works are designed to take an increase of population, in which latter case any effect would not be immediately felt.

Passing on to deal with the replies, the author said it was interesting to note that in Huddersfield a charge of 1d. per 1000 gallons is made for the reception of all trade effluents; while in Halifax a charge of £3 per million gallons is made. In the case of Malvern, 4000 gallons of gas liquor per day on a dry-weather flow of 600,000 gallons (two-thirds of 1 per cent.) gave trouble; but since the manager of the gas-works put down large precipitation tanks, and strained the liquid through a filter of fine chippings, no trouble has been experienced. The conditions for the reception of the spent liquor from sulphate of ammonia plant by the Croydon Corporation require the liquor to be settled to free it from solids and to cool, and allow the discharge of a maximum of 1 per cent. of sewage flow.

The most interesting of the replies were those relating to the positive effects of the liquor; and the author's remarks on them were as follows: At Stoke-upon-Trent, a large quantity of the liquor passes into the sewers, and the Gas Committee are to be approached to deal with the liquor at the gas-works. Every precaution is taken here. The liquor is treated separately on account of the deadly effect upon organic life in the bacteria beds; it is treated in storm-tanks, and discharged on to land for final purification. The sewage is dealt with at six works. Monthly analyses are taken, the results of which show the difficulties with which the sewage engineer has to contend. To give an illustration: At the Burslem works, on March 29, 1911, the waste liquor from the gas-works sulphate of ammonia plant gave the following results on analysis: Three minutes oxygen absorption = 26·7 parts per 100,000; chloride, in terms of chlorine, 32 parts per 100,000. The results also show the river samples to have high oxygen absorption figures, both above and below the outfall. In Dr. Reid's report for 1910 to the Staffordshire County Council, the following significant remarks occur: "In the north of the county, however, the improvement of the streams, which otherwise would have been apparent as the outcome of the large expenditure in sewage-disposal works, has to a considerable extent been obscured by the continual discharge into the streams of wastes from ammonia-recovery plants."

At Salford, where the sewage is treated by chemical precipitation *plus* bacterial filters, and the dry-weather flow is 11 million gallons per day, and the volume of liquor slightly exceeds 1 per cent., the effect upon the sewage works is described as very bad, and the Committee have under consideration the matter of treating the gas liquor. At Oldbury, with a dry-weather flow of 850,000 gallons per day, they have as much as 8 per cent. of effluent discharged from various chemical-works—being the waste from the process of distillation involved in the recovery of ammonia from gas liquor; and at that town the sewage is dealt with in open tanks and triple contact beds. The liquor is only treated at the gas-works by settlement; and the Borough Engineer remarks "that it makes the treatment almost impossible by any other method than the one adopted." In this town, however, the manufacturers, by agreement, contribute an annual payment for treatment of the wastes. From Manchester it is stated that the liquor appreciably increases the oxidizable matter in the effluent, though the volume is less than 0·5 per cent. In Leicester, with a dry-weather flow of 8 million gallons, and a liquor discharge of less than one-fifth of 1 per cent., and where the solid matter is settled in tanks and the clear effluent only passed to the sewers, the Borough Engineer remarks "that cyanides somewhat increase the oxygen consumed in the treatment."

From these remarks it certainly appears that the maximum amount of 1 per cent. of dry-weather flow should not be exceeded; and even with this, where the effluent is going to bacteria beds without apparent injury resulting, it should be borne in mind that such beds must be of larger capacity than would be the case when gas liquor was not received, or the result is a diminished purification power of the sewage-disposal plant, and the outcome will be an earlier extension of the plant than would be otherwise necessary.

As it is certain that gas manufacturers should purify their gas liquor before its discharge into sewers, and, further, that local authorities should give all assistance in their power, some method of treatment is essential so as to prevent pollution of streams or the diminishing of the efficiency of sewage-disposal works. Purification by dilution (if purification it can be called) means increasing the cost of purification owing to the extra works required; and consequently this method should be ruled out of consideration.

Certain of the authorities to whom the inquiries were sent reported that the gas manufacturers had adopted plant for the purpose of a preliminary purification, and after this treatment the liquor was being received into the sewers without any detrimental effect, although previous to such treatment the most serious consequences had occurred. The importance of this being appreciated by the author, he visited two places where such a process is in operation—viz., St. Albans and Enfield. At the former place, the manager of the sewage-works stated that he found, previously to the purification of the gas liquor, the unpurified effluent upset septic treatment, and destroyed the bacteria in the contact beds or percolating filters, increased the odour at the sewage works, and also prevented the settlement of the solids; but that since the preliminary treatment by the gas company this action had ceased. With a view to ascertaining the cause of this, the author was permitted by the manager to inspect the purification plant at the gas-works, and having been referred to the designer of the plant (Mr. J. Radcliffe), he had an interview with him, and obtained a description of the process.* The waste gases remaining after the absorption of the ammonia are made to purify the waste liquid. The plant can be added to any existing sulphate plant; and there is no interference whatever with the working of the latter or the ultimate disposal of the waste gases, though, if required, the problem of the ultimate disposal of the sulphuretted hydrogen can be assisted. There are no costs for materials for purification other than a small amount of steam and coke. There are no additional costs for labour, as the sulphate operator can easily give any attention required; and the plant being of cast iron and brick, its depreciation is very small. The process begins and stops with the working of the sulphate plant, being practically continuous and automatic. No skilled knowledge is required; and no smell or other nuisance arises from its working.

* See "JOURNAL," Vol. CXIV., p. 379.

* The process was described by Mr. Radcliffe in the "JOURNAL" for Oct. 2, 1906 (p. 22); and it has been referred to since.—ED. J.G.L.

Sir Bosdin Thomas Leech, of Oak Mount, Timperley, Cheshire, an Alderman and a former Mayor of Manchester, and Chairman of the Water Committee of the Corporation, who died on April 16, as announced in the "JOURNAL" at the time, left estate valued at £132,922 gross, with net personalty to the amount of £28,826.

GEOLOGY AND WATER SUPPLY OF CHELTENHAM.

At the recent Annual Meeting of the Institution of Water Engineers at Cheltenham, a paper on the geology of the district was read by Mr. L. Richardson, F.R.S.E., F.G.S.; and on the same occasion, Mr. J. S. Pickering, M.Inst.C.E. (the President), distributed a printed description of the Cheltenham Water-Works, of which he is the Engineer. The two communications were so closely connected that they may be given together, with the explanation that only extracts are made from the one dealing with the geological subject.

GEOLOGY OF CHELTENHAM, WITH PARTICULAR REFERENCE TO THE WATER SUPPLY.

By L. Richardson, F.R.S.E., F.G.S.

Cheltenham is situated in the vale land of the Lower Severn Valley at the foot of the Cotswold Hills. Put very briefly, the geologic structure of the portion of the valley which lies between Tewkesbury and Gloucester, and of the portion of the Cotswold Hills which overlooks it on the east, is as follows: To the west of the Severn, the ground is very red and undulating. The soil is red, because the underlying solid rock, from which, as a rule, it is mainly derived, is the rich-red Upper Keuper marl. The country is undulating, mainly because at about 215 feet below the top of the Upper Keuper formation is a band of sandstone, which has been considerably flexured by crust-movements; and denudation, acting upon this flexured sandstone and associated marls, has produced a land-relief best described as "undulating." On the east side of the Severn—roughly speaking between that river and the Cotswold Hills—clay land predominates. The deposit which gives rise to this heavy ground belongs to the Lower Lias.

It is usually stated in text-books that the rocks of the Cotswold Hills have a south-easterly dip. This is only a general statement; the rocks being disturbed by an enormous number of faults, great and small, and the dips varying considerably both in the matter of degrees and direction. Anyhow, the prevalent dip in the Cheltenham district is south-easterly, which means that nearly all the rain water which falls upon these hills ultimately finds its way in this direction. Consequently, towns like Cheltenham in the vale land at the foot of the Cotswold Hills derive comparatively little water from the neighbouring high ground. Here and there in hollows in the surface of the Lower Lias clay of the vale are deposits. In times gone by, wells sunk in the sand or gravel bed yielded supplies adequate for the requirements of the inhabitants of Cheltenham; but with an increase in the population and changes of opinion as to what constitutes a satisfactory supply, other sources had to be tapped. The history of the development of the system whereby Cheltenham is now supplied with water is to be told by the President, so that in this communication the author will confine his remarks to the inter-connection between the rock structure of the district and the water supply, without going into any constructional details.

The author has neither read nor heard that it was ever contemplated to put down a boring to secure an additional water supply for Cheltenham. It is well that it was not; for a boring, say at the Town Hall, would have to pass through several feet of yellowish clay (alluvium), 20 feet to 30 feet of gravel and loam, some hundreds of feet of blue Lias clay, and of the extremely tough limestones and clays of the lower portion of the Lower Lias before the Rhaetic would be reached; and if any considerable supply were required, the boring could not be abandoned there, but it would have to penetrate the Rhaetic Series (35 feet), and go far into the Keuper.

Water obtained from wells in or issuing in the form of springs from limestones in the lower portion of the Lower Lias, and from the clays of the upper portion if derived from the neighbourhood of bands of limestone, is very hard. Between the lower portion in which limestones predominate and the higher portion in which clay preponderates are clays with more widely-spaced limestone bands. These occupy a far greater surface extent in the vale than has usually been realized; and the water available from the neighbourhood of the limestone bands has rendered possible the erection of many farms and houses.

One of the principal water horizons in this part of Gloucestershire is that where the relatively impervious Lower Lias clays meet with the succeeding sandy clays of the Middle Lias, the sandy beds are easy to locate. In ascending the lower portion of the hill slope, damp ground will be noticed, followed by dry soil with a wealth of gorse bushes. Above the slope marked by these bushes will usually be found flat ground, originated by the hard marlstone. Water falling upon the porous ground sinks in, and, as the prevalent dip is in a south-easterly direction, soon disappears, travelling in that direction. Consequently, if a comparatively small supply of water is desired from this source, the farther up the hill slope the well sinker goes the better; but, of course, the well has to be deeper.

A number of springs also issue from the neighbourhood of the marlstone. As this contains a large amount of iron, the water is usually very ferruginous. Such highly-coloured water may be observed at a spring above Woodmancote, and at another near Prinknash; while the name "Red Well" for a spring at Matson, near Gloucester, explains itself.

The principal horizon from which water issues in this district is from the top of the Upper Lias clays—that is, from the base of the porous overlying Cotswold sands or Inferior Oolite limestones. The prevalent dip of the Inferior Oolite beds is again to the south-east; but the beds are much faulted. It has been a considerable drawback to towns and villages at or near the foot of the Cotswold Hills that the dip of the beds has been away from them. If it had not been for the little valleys produced by the headward growth of the Severn tributaries and faults, such towns and villages would have been at one period very badly off. The River Chelt, which contributes most of the water that is stored in the Dowdeswell reservoir, derives its main supply from this horizon, the water from which is also hard, and it is easy to see why. The slightly carbonated waters percolate through the limestone, dissolving some of it; and when they reach the clay, they try to flow in the direction of its surface slope. The initial trickle develops into a small stream, the waters of which slowly dissolve the contiguous superincumbent limestone; and gradually a long, narrow cave is produced.

The clay slopes of the Upper Lias are frequently rendered hummocky with masses of Oolite which have become detached, slipped down, and usually have pressed unequally into the relatively soft clay surface. Small quantities of water are often retained in these little limestone-filled hollows in the clay, and during and after damp weather surplus water often issues as springs. Isolated houses can frequently obtain an adequate supply of water from such sources; but growing hamlets soon experience a shortage which is not always easy to remedy.

The fullers' earth is an important water-upholding deposit. Cirencester derives its water from deep wells and borings sunk through the Great Oolite—the water occurring in the Great Oolite, but being held up by the fullers' earth clay. The main mass of the fullers' earth and Great Oolite does not extend up to the Cotswold edge in the neighbourhood of Cheltenham. It is situated, as a rule, some way back, and only outlying masses or masses preserved by faulting occur. Many villages on the hills to the east and south-east of Cheltenham have originated as farms situated near a spring given off from the junction of the Great Oolite and fullers' earth. The clays of the forest marble, on top of the Great Oolite, have proved most useful in portions of the Mid and South Cotswolds. They have held up and placed within reasonable reach supplies which would, without them, have been out of reach of comparatively shallow wells.

In conclusion, it is necessary to return to the sand and gravel deposits which determined the position in which the town of Cheltenham was constructed. In Glacial times, many of the hollows in the vale were filled up with gravel and sand. The River Chelt has scoured out for itself a course through the sand-bed, and has subsequently largely filled up the broad hollow it created by a deposit of gravel, loam, and bog, overspread by fine-textured, sometimes sandy, but generally clayey, alluvium. The maximum thickness of the deposit made by the Chelt is about 50 feet. The water from wells sunk in the gravel near the Chelt is hard; and this is not surprising when the composition of the gravel is remembered—mainly limestone pebbles. At the Sandford Road pumping-station is a well in this Chelt gravel, 24 feet deep and 18 feet in diameter. It is said to be capable of yielding 200,000 gallons per day in ordinary weather. The baths of Cheltenham College derive their supply from five wells sunk in the sand-gravel bed, and four are generally drawn upon. On an average, they are 25 feet deep, 6 feet in diameter, and yield about 150,000 gallons per week. The water is said to be quite satisfactory and sufficient in quantity.

From the remarks made in this paper, it will be clear that towns situated on the Lower Lias at the foot of hills composed of rocks which dip away from the towns, and which also constitute divides between great river systems, must go some distance afield in order to secure a continuous adequate supply of water. Thus Cheltenham has had to draw upon the Severn at Tewkesbury, and Gloucester has resorted to the abundant supply contained in the Triassic sandstones of the Newent district.

At the close of the paper,

Mr. Preston, referring to the highly-coloured water at Red Well mentioned by the author, asked whether it was produced by red oxide.

Mr. Richardson said it was due to oxide of iron. He always kept a keen look-out on any borings in the district; and the only drawback was that one had to go through such a huge mass of literature before one could discover the records of borings in the past. He thought it would be very convenient if records of all deep borings in search of water were contained in the Institution's "Proceedings."

THE CHELTENHAM WATER-WORKS.

By J. S. Pickering, M.Inst.C.E.

The present area of supply is about 60 square miles, and comprises the borough of Cheltenham and 22 surrounding parishes. The water is derived from three sources—springs in the Inferior Oolite of the Cotswolds, the head waters of the Chelt, and the River Severn.

Particulars of the Supply.

The spring water is supplied unfiltered, and is stored in two open brick reservoirs having a combined capacity of 30½ million gallons, two covered reservoirs holding 2 million gallons situated

at Hewletts, and an open brick reservoir at Leckhampton containing 1¾ million gallons. An impounding reservoir at Dowdeswell, having a capacity of 100 million gallons, stores the head waters of the Chelt, which are mainly from the Oolite. The Severn water is pumped from Tewkesbury, a distance of about eight miles from Cheltenham.

The undertaking was established by a Water Company in 1824; their supply works comprising the reservoirs at Hewletts and Leckhampton. In 1865, the Company obtained an Act for supplying Tewkesbury; and for this purpose a small pumping-station was erected on the Severn in 1869. An attempt was made at that time to supply Cheltenham from the same source; but it failed, owing to the opposition to a river supply. The proposal was revived by the Company a few years later, but was again strenuously opposed; the Cheltenham authorities suggesting an alternative scheme for an impounding reservoir at Dowdeswell. The Company being unwilling to entertain this, and the objection to the Severn supply being so strong, it was ultimately arranged to transfer the undertaking to the Corporation. The purchase was made in 1878; and in 1886 the Dowdeswell reservoir and filtration works were brought into use.

This new source of supply proved to be inadequate to meet the growing requirements of the district, and there appeared to be no alternative but to introduce Severn water. Accordingly, in 1900, a new pumping-engine was erected at Tewkesbury; and in order to appease the opposition, the size of the pumping main was limited to 9 inches in diameter. This small pipe proving insufficient, a second main, 12 inches diameter, was laid three years later. Since the author's appointment nine years ago, additional pumping and filtering plant has been installed at Tewkesbury, and at the present time the town depends upon the Severn for about one-third of its water.

The various sources and levels of supply make the distribution somewhat complicated and difficult. The Ordnance level in the centre of the town is about 195 feet. The top water-level at the Hewletts reservoir is 408 feet above Ordnance datum, at the Dowdeswell pure-water tank 353 feet, at the Leckhampton reservoir 380 feet, and at the Tewkesbury pumping-station about 42 feet.

Water from the Severn is only pumped during the summer months, when the town reservoirs are low, and is delivered direct into the mains. When pumping ceases, the borough of Tewkesbury receives its supply from the Cheltenham reservoirs. The population at present served is approximately 60,000, and the average daily consumption is 1,350,000 gallons. The normal consumption for domestic purposes is about 17 gallons per head per day. The capital expenditure has been very heavy; and, after deducting sinking funds, it now amounts to about £346,000. The expenditure last year (including £18,263 for payments on capital charges, rates, and taxes) amounted to £22,713, and the receipts to £24,075.

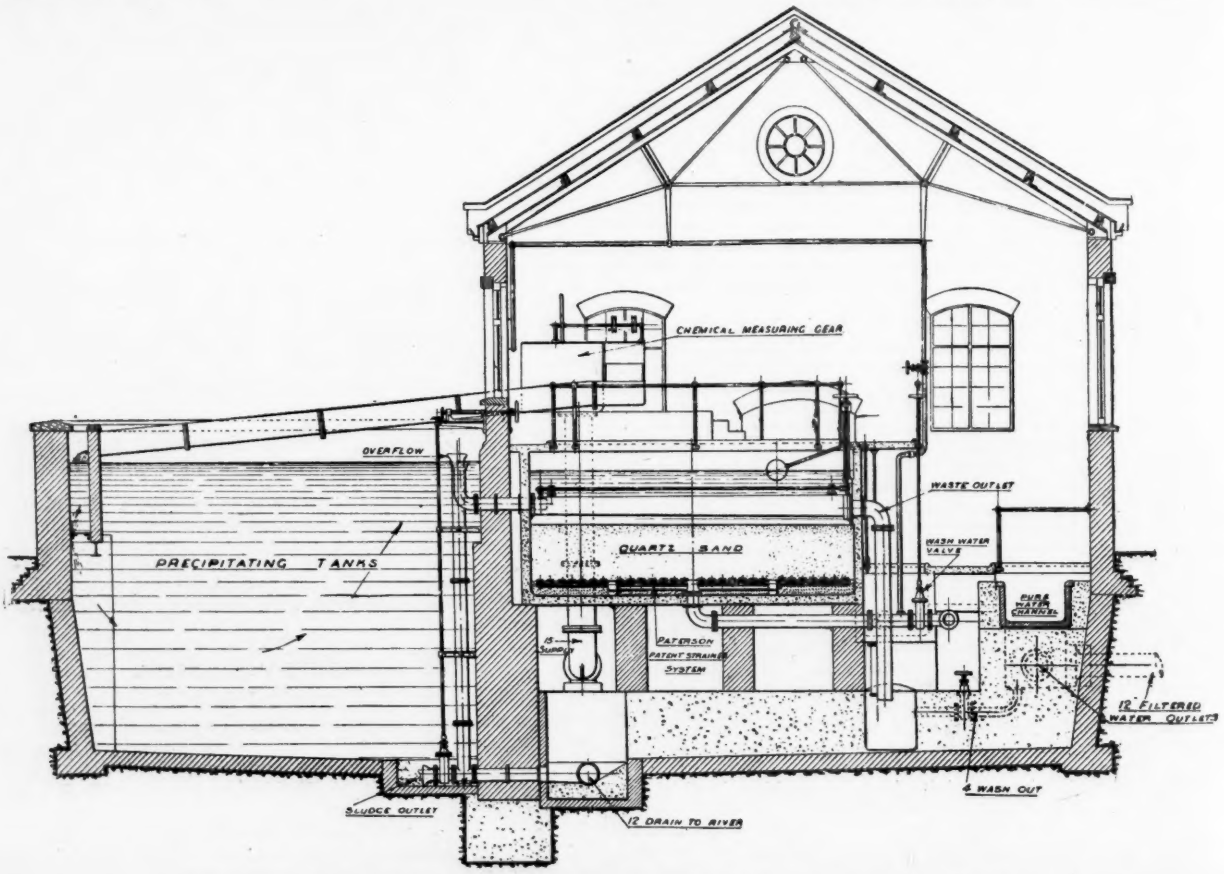
Tewkesbury Pumping-Station.

As the works on the Severn at Tewkesbury are the most interesting from an engineering point of view, a brief description will probably be acceptable.

The Severn is one of the largest of the English rivers. It rises on the eastern slopes of Plynlimmon, and flows a distance of nearly 200 miles to its mouth in the Bristol Channel. It has a drainage area of something like 4500 square miles; and the various geological formations over which the water passes alter its composition very considerably at different periods of the year. The river at times is very turbid, due mainly to the surface water off the marl; and it is frequently of a brown colour from the peat and decaying vegetable matter in the upper reaches. The summer flow at Tewkesbury is estimated at from 35 to 40 million cubic feet per day. The Corporation have power to abstract 500,000 cubic feet per day; but present requirements are met by about one-third of this quantity taken only for some six months in the year.

The river in its circuitous course undergoes a remarkable process of self-purification, and upon reaching Tewkesbury it becomes, with suitable treatment, a first-class water. Owing to its turbid character and the absence of a storage reservoir, the water is difficult and costly to deal with. The filter-beds are of the usual type, and give good results. But they seldom work for more than two weeks before the surface film has to be removed; and not infrequently they become thickly coated, and have to be cleaned after working two or three days. This entails a considerable amount of labour and the waste of a large quantity of water.

In order to overcome these difficulties and to provide for a larger supply, a system of preliminary treatment in the form of rapid pre-filters is being introduced. These filters are of the gravity type, and are being installed by the Paterson Engineering Company. They are capable of dealing with at least a million gallons in 24 hours. The water pumped from the river enters an elevated tank in the filter-house and discharges through V notches, which accurately gauge the quantity passing. Arrangements are made for adding a coagulant and sterilizing reagent when considered desirable. A float on the surface of the water controls the position of two tapered valves giving annular orifices for the supply of the reagents in precise ratio to the quantity of water delivered. The head of the reagents above the valve-seatings is maintained at a constant level by ball-cocks communicating with pressure storage-tanks in the basement. The contents of these tanks are continually agitated by compressed air, which also supplies the pressure necessary to lift the reagents to the controlling apparatus referred to. The solutions are prepared in concrete tanks on the filter-house floor level; the necessary agitation and mixing being secured by a small propeller driven by a compressed-air motor. The reagents are thoroughly mixed with the water in its passage along a "salmon-ladder" mixing-trough, which discharges into a reaction and precipitating tank having a capacity of about three hours' pumping. The partially purified water over-



Cross Section of the Filters at the Tewkesbury Pumping Station of the Cheltenham Water-Works.

flows through bell-mouthed draw-off pipes into six Paterson rapid gravity filters, each measuring 16 ft. by 8 ft., and having a total filtering area of 768 square feet. The filter medium consists of a depth of 30 inches of specially graded quartz sand, resting on a stratum of pea gravel. Situated centrally in each filter is an inlet distributing and waste draw-off channel. The water from each filter is collected underneath the gravel by about 400 gun-metal strainers having screwed caps and renewable phosphor bronze screens, and is conveyed into a central 6-inch outlet duct, from which it passes through an automatic outlet controller into an inspection-box, and thence into the clear-water channel.

The outlet controller is designed to secure two essentials of successful filtration—viz., that the filtration process should start gradually after the cleansing of the filter-bed, and that under no circumstances should the rate of flow through the filter become excessive. The controller is in the form of an equilibrium valve under double control. Thus, when the cleansing process is complete and the water above the filter-bed is lowered to the level of the waste trough, the valve is held in its closed position by a float above the filter; but as the filtering operation recommences, the valve is allowed to open gradually until the water has reached a predetermined level above the filter-bed, when it is released from the restraint of the float, and the discharge is controlled only by the regulating float in the inspection-box. This box is fitted with an overflow weir in the form of a V notch; and the arrangement is such that, when the water-level rises to the height determined by the maximum allowable rate of discharge as measured by the weir, the regulating float partially closes the outlet-valve, so that under no circumstances can this maximum desirable rate of filtration be exceeded. Each inspection-box is provided with a valve, so that, if desired, the filtered water may be run to waste.

The filter is cleansed by first thoroughly agitating the sand bed for a minute or so with sterilized compressed air at a pressure of about 5 lbs. per square inch, and then by a reverse current of cleansing water flushing the loosened impurities into the central waste-gutter and thence into the drain. In this way each filter is thoroughly cleansed and started to work in a few minutes, though the controller may not allow the filter to come into full operation until 10 or 15 minutes later.

The necessary compressed air is obtained from a direct-acting steam-driven air-compressor placed in the boiler-house. The air is filtered and sterilized before passing into the air-storage reservoir. The compressor is fitted with an automatic governor, which regulates the speed of the pump in accordance with the demand made for the compressed air—maintaining a uniform pressure of 50 lbs. per square inch; the supply to each filter being drawn off through a reducing-valve at 5 lbs. per square inch. All the valves and fittings are so arranged that the entire filtering and washing operations are controlled from the front gallery.

After leaving the pre-filters, the water will be passed through ordinary sand filters, of which there are six, having a combined area of 2816 square yards. An additional filter is in course of construction, and when this is complete the total area will be 3566 square yards. When the whole of the filters are working, the speed of filtration in dealing with a million gallons of water in 24 hours will be at the rate of 2½ inches per hour. When one of the largest filters is undergoing cleaning, the rate of filtration will be increased to 3·2 inches per hour. It is anticipated that the slow sand filters will work for a long period without cleaning, as the pre-filters are expected to remove all visible suspended matter. It is also hoped that by the use of a coagulant the objectionable brown colour of the water will be greatly reduced. As to the final purification of the water, there is no doubt that it will be all that could be desired.

The pumping plant consists of two sets of Worthington triple-expansion steam-pumps—one set being capable of delivering 50,000 gallons and the other 33,000 gallons per hour. A beam-engine pump delivering 24,000 gallons per hour is used for supplying Tewkesbury when the Worthington engines are not in use for pumping to Cheltenham. The boilers work at a pressure of 150 lbs. to the square inch, and the steam is superheated to about 120° Fahr. The pressure on the pumping main, when delivering water to Cheltenham, varies from 150 to 200 lbs. per square inch, according to the quantity pumped. The high pressure of water is found very useful in connection with the sand washing, this being carried out in an economical manner by one of Messrs. Pettit, Garside, and Webster's washers.

Estimation of Tar in Producer Gas.—A recent number of the "Chemiker Zeitung" gives a description by Herr A. Gwiggner of a method which he has devised for the estimation of the tar and soot in hot producer gas. In the pipe which conveys the gas from the producer is a short socket for the support of the tar-filter. The filter consists of a hard glass tube, about 16 inches in length and 1¼ inches in diameter, which is half-filled with slag wool. After this filter is placed a condenser with a cooled graduated condensing tube for the separation of light tar oils. Then come in series two calcium chloride tubes for the absorption of aqueous vapour. The filter, the condenser with the graduated tube, and the calcium chloride tubes, are all weighed before and after use. The gas is drawn through them in a rapid stream by means of an aspirator. The author claims that the method effects the extraction of the tar and all condensible matter from the gas, and that it is applicable to gas drawn from a pipe at a temperature exceeding 1100° Fahr., where filters of cotton wool cannot be used.

WATER ABSORPTION BY COKE.

Experiments have been undertaken in order to determine the absorbent power of coke in cold water; and some of the results obtained, which have recently been published in "Stahl und Eisen," were given in the "Iron and Coal Trades Review" last Friday. The coke was used in pieces of medium size—such as are adapted for charging foundry cupolas. The samples were procured from two neighbouring coking plants, designated I. and II. respectively in the subjoined tables.

For determining its water-absorbing power, the trial coke was first thoroughly dried, then accurately weighed, immersed in cold water, and re-weighed after the periods of time stated in Table I. The water absorbed is expressed in percentages—the tests being in triplicate.

Experiments were also conducted to show the hygroscopic property of the coke. Thoroughly dried coke of about the size of a man's fist was placed in a moist chamber, and the water absorption determined after the intervals stated in Table II. The moist chamber consisted of a wooden box of about 35 cubic feet capacity, having a false bottom. Into this box cold steam was slowly admitted, so that the air of the chamber was soon impregnated with moisture. As a measure for the humidity, the absorption of water by calcium chloride was also determined; and the results obtained are given for comparison. These results, together with those for the coke, are clearly shown in Table II.

TABLE I.—*Water Absorption of Coke in Cold Water.*

Time the Coke remained in the Water.	Coke-Works I. Average Water Absorption.	Coke-Works II. Average Water Absorption.
	Per Cent.	Per Cent.
½ hour	6·20	4·2
½ ,,	7·23	4·6
1 ,,	7·7	5·2
2 hours	9·1	6·6
3 ,,	10·1	7·7
6 ,,	11·2	8·7
12 ,,	12·9	9·9
24 ,,	14·1	10·9
2 days	15·9	12·4
3 ,,	17·2	13·5
4 ,,	17·2	13·5
5 ,,	17·3	13·6
6 ,,	17·3	13·6

From the experiments in Table I., it appears that the maximum absorption of the coke in cold water was not reached until the end of three days, after which time the increase became very slight. The hygroscopic capacity, or water absorption from moist air, was reached within the fifth day. The experiments show that, in estimating the water contained in coke, a great deal of judgment must be exercised to ensure correct results.

TABLE II.—*Water Absorption of Coke in Moist Air.*

Time the Coke Remained in Moist Air.	Coke-Works I. Average Water Absorption.	Coke-Works II. Average Water Absorption.	Calcium Chloride Absorbed in the Same Time. Water in Percentage of Weight.
	Per Cent.	Per Cent.	Per Cent.
6 hours	0·02	0·06	15·2
12 ,,	0·03	0·08	18·8
18 ,,	0·03	0·10	29·6
24 ,,	0·03	0·08	38·8
2 days	0·07	0·20	49·8
3 ,,	0·07	0·20	59·1
4 ,,	0·08	0·21	66·6
5 ,,	0·09	0·24	74·2

BORING OPERATIONS AT THE STOURBRIDGE WATER-WORKS.

On the occasion of the recent meeting of the Institution of Municipal and County Engineers at Stourbridge, a paper was read by Mr. W. FIDDIAN, the Consulting Engineer to the Stourbridge and District Water Board, on the undertaking of the Board, and on some boring operations which have been carried out in connection with it. The following are the principal portions of the communication.

A little more than two years ago, the Stourbridge and District Water Board acquired by parliamentary authority the undertaking of the Stourbridge Water-Works Company. The population served is about 400,000, and the present consumption of water is about 1,300,000 gallons per day. The supply is obtained from three pumping-stations, known as Mill Meadow, Coalbournbrook, and The Tack, with wells and boreholes in the bunter measures of the new red sandstone. These stations are in the valley of the River Stour; Mill Meadow being about three-quarters of a mile above Coalbournbrook, and The Tack a similar distance below,

The waters obtained from Mill Meadow and Coalbournbrook have each 25 degrees of hardness; while that of The Tack has only 12 degrees. This difference appears to be due to The Tack borings being in the lower sections of the bunter sandstone, where they outcrop at the lip of the basin in which the water is impounded. The Coalbournbrook pumping-station is situated on the deepest portion of this basin.

In a recent report presented to the Board by the author, it was recommended that, for purposes of economy in pumping, and for securing an improved supply, both as to quantity and softness, the Coalbournbrook station should be adopted as the main source of future supply, that the existing 20-inch borehole should be deepened from 200 feet (its then depth) to 400 feet or more, and a new engine-house, with high-duty pumping plant, erected; also that an additional reservoir for the low-level service, in a more suitable position, and at 40 feet higher level, than the present one, should be provided, with the requisite pumping and distributing mains for the rearrangement of the high and low level areas. The works are now in progress. The main purpose of this paper, however, is to describe the work done in deepening the 20-inch boring at Coalbournbrook, and particularly the separation of the upper and harder water of this borehole from the softer water met with in its deepened portion.

It should be explained that the original supply was taken from a well about 50 feet deep, with a 7-inch borehole, to a depth of 140 feet from the surface. At this depth a large quantity of water was met with, and further boring was considered unnecessary. In later years, after the erection of additional pumping plant, the Water Company desired to increase the supply from this station; and it was then that the 20-inch borehole was made at a point some 60 feet distant from the well. At 138 feet from the surface, the boring operations caused a marked discoloration of the water in the well; and, as a supply from this source had to be kept up, they could only be carried on intermittently. So that, presumably on this account, and because of the increase of water already obtained, operations were stopped when a depth of 200 feet was reached. From a knowledge of these and other facts, it became evident that a horizontal parting in the sandstone, of considerable water-carrying capacity, existed between the 20-inch borehole and the bottom of the 7-inch bore from the well, and that the bulk of the water supply was obtained from this parting.

When considering the problem of obtaining an increased and improved supply of water for the undertaking on its acquisition by the Board, the author found it practicable to make alterations at The Tack pumping-station, by which the Coalbournbrook station could be shut-down during periods of ordinary consumption, so as to allow of the 20-inch boring being continued without discoloration of the supply. Starting from the existing depth of 200 feet, the contractors for the work carried the 20-inch bore at its full diameter through the pebble beds and about 85 feet into the lower bed of the bunter sandstone—making the total depth 500 feet.

Tests were made at intervals during the boring operations (by means of the existing permanent pumping plant), to find, as far as possible, the extent to which the supply of water had been increased; and samples were taken of the water obtained below 200 feet from the surface during pumping, to ascertain the character of the new water. By means of a comparison of the records of the levels of water in the well and the 20-inch borehole respectively before the boring commenced with those taken at the several stages of its progress, the conclusion was arrived at that a total quantity of more than 2½ million gallons of water per day would be obtainable at this station.

The quantity of water coming from the lower portion only of the 20-inch borehole having been estimated to be more than the Board's present requirements, its hardness found to be 12 degrees, or about one-half that of the upper water, and its quality excellent, it was decided to attempt to make a controllable separation of the two waters. This was very successfully effected in the manner now to be described.

The 20-inch borehole as originally put down was lined with 20-inch steel tubes to a depth of 110 feet. This lining has now been extended some 45 feet with 16-inch tubes. It was sealed at the bottom to the side of the borehole by being lowered into 6 feet of liquid cement held up by a plug temporarily formed in the borehole. When the cement had set, the portion projected inside the tube and a similar portion of the plug below were cut away. The joint at the connection of the 20-inch and 16-inch tubes was also made with liquid cement—a packing-ring between the two tubes, about 6 feet from the top of the smaller tube, preventing the cement grout passing down below it. By this means an annular space was left between the 16-inch tube and the rock side of the borehole from 110 feet to 155 feet from the surface, between which points (at 138 feet) the before-mentioned parting gives communication with the well borehole. When the work was complete, it was found that the object aimed at had been realized, as the lowering of the water-level in the well 40 feet only slightly affected the level in the 20-inch borehole.

The 20-inch borehole has been connected to the well by a 15-inch cast-iron pipe controlled by two sluices. The level of this connection is 35 feet below the top of the borehole, and the standing water-level is 2 feet below the top. To make the connection, a shaft was sunk between the borehole and the well (some 10 feet from the former), and a heading driven in the sandstone rock in both directions. The suction-pipes of the pumping plant to be erected will be taken down this shaft and connected to the 15-inch horizontal pipe between the two sluices. By this arrangement, water can be obtained from the 20-inch borehole only, from the well only, or from a combination of both sources of supply, in such proportions as may be desired. On the connection of the 20-inch borehole to the well by a pipe, it became possible to make a direct pumping test of the yield of the former. This proved to be practically what was estimated before the upper and lower waters were separated—viz., over 1½ million gallons per day.

The new plant will consist of a triple expansion rotative steam-engine, with vertical and inverted cylinders and direct single-acting ram pumps, capable of raising 1½ million gallons of water per day with a lift of about 300 feet. This will be used for low-level requirements. For high-level service, it is intended later on to remove and instal here the high-duty Worthington engine at present at the Mill Meadow station, the capacity of which is 500,000 gallons per day against a head of about 450 feet. When the whole of the new works are complete, the demand for the low-level area is expected to be about a million gallons per day, and for the high-level area about 300,000 gallons per day. The advantage of having all the pumping at Coalbournbrook, instead of being spread over three stations, is unquestionable. The plants at Mill Meadow and The Tack and the existing pumping-engines at Coalbournbrook will in future be maintained for ordinary stand-by purposes, and for use in case of exceptional demands for water.

DELHI WATER SUPPLY AND WORKS.

In view of the choice of Delhi as the seat of Government of India, interest was taken at the recent Congress of the Royal Sanitary Institute at York in a paper contributed by Mr. T. SALKIELD, the City Engineer of Delhi, on the past history and present condition of the town.

With regard to the water supply, the author said the works were inaugurated in 1890, when the sole source of supply was from a chain of 84 infiltration wells sunk along the bank of the River Jumna, which were calculated to yield 1,750,000 gallons in 16 hours. But from the start there was trouble, as sand was drawn into them, and by 1893 the supply of water had considerably diminished. A second series of wells, 60 in number, was constructed. But in 1896 the yield had dropped to 611,000 gallons in 16 hours, and was so insufficient that direct pumping from the river had to be resorted to, when sedimentation tanks and sand filter-beds were established. The wells are no longer used as a source of direct supply, but have recently been put to a use not originally intended. When the river is in flood during the monsoon period, it carries a large quantity of silt in suspension, which gave much trouble by scoring the pump-rods and clogging up the filter-beds; but, owing to the head of water in the river at such times, the wells stand full of clear water, and from them it is drawn and passed through the filter-beds.

The head works were further enlarged to provide an adequate supply of water for the great Durbar. They are not quite finished; but on completion will consist of the following.

Intake.—One Babcock and Wilcox boiler and three locomotive boilers; and three Worthington horizontal triple-expansion multiple pumps, any two of which can be coupled together. Each pump is 13 I.H.P., and capable of raising 80,000 gallons an hour through two 14-inch rising mains to sedimentation tanks against a head, including suction and loss by friction, of 32 feet.

Main Plant.—Three Babcock and Wilcox boilers; and two Worthington horizontal triple-expansion multiple pumps, each 90 I.H.P., capable of lifting 108,000 gallons an hour. One Worthington horizontal triple-expansion multiple high-duty pump, capable of lifting 160,000 gallons an hour, is now being installed. In each case the pump lifts water through an 18-inch or a 20-inch rising main 6100 feet long to the service reservoir against a head of 155 feet, including suction and loss by friction. These pumps are fitted with surface condensers, and the boilers of the main plant are provided with superheaters and economizers.

Reservoirs and Filter-Beds.—The service reservoir has a capacity of 2½ million gallons. The settling-tanks are two in number, and each is divided into three compartments. The original filter-beds were six in number, 113 feet by 80 feet. But the number is now being increased, and on completion it will consist, in addition to the original six, of six filters, each 170 feet by 100 feet; also one 17-feet diameter filter, capable of dealing with 500,000 gallons in 24 hours. The consumption of water during the year 1911 was 10 gallons per head per day. The filters were designed to filter at the rate of 40 gallons per square foot per 24 hours; but prior to the extension of the plant they had to be worked at a much higher rate. To enable the settling-tanks and filters to work continuously, a clear-water reservoir has recently been constructed to collect the filtered water during the hours when the main engines are not working. This reservoir is divided into two compartments, each capable of holding 600,000 gallons. From time to time, samples of water are taken for analysis, and the results have always been satisfactory.

It is of interest to record that throughout the city a gratuitous supply of filtered water is given by means of standposts. This has had a wonderful effect upon the health of the community, as diseases, such as cholera, enteric fever, and Delhi boils, have ceased to be endemic.

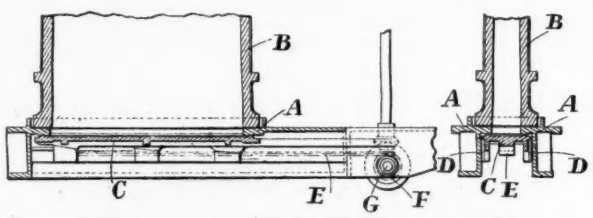
REGISTER OF PATENTS.

Closing Devices for Vertical Retorts.

CLARKE, H., of London Wall Buildings, E.C., and CAMPBELL, J. A., of Ilford, Essex.

No. 16,311; July 14, 1911.

This invention (more especially applicable to vertical retorts) has for its object to provide a readily operated device or cover-plate which will make an "efficient and gas-tight closure" of the retort by a sliding door to open or close by movement along a slideway, with co-operating cams, inclined surfaces, projections, or the like provided upon the door and the slideway respectively, and adapted, upon the closing movement of the door, to press the latter firmly upon the seating provided upon the door-frame.



Clarke and Campbell's Vertical-Retort Closing Device.

As applied to the lower end of a vertical retort, the frame member A, upon which the retort B is mounted, is formed with an aperture corresponding to the mouth of the retort, and having at the underside a seating against which the cover-plate C is adapted to be pressed. Immediately below the seating the frame member is formed or provided with a slideway D for the cover-plate at each side of the aperture, and which slideways are extended laterally of the retort sufficiently to permit the cover-plate being withdrawn to uncover the aperture completely. Adjacent to the slideways, and advantageously formed integrally with them on the inner sides, there are two series of inclined surfaces or abutments. The cover-plate is of a shape corresponding with the shape of the seating around the aperture, and is preferably provided upon the upper side with ridges by which a joint may be made with the seating.

Upon the under-surface it is formed at the side edges with slide faces for engagement with the slideways D described, and adjacent thereto, with two series of inclined surfaces or abutments adapted to contact with the corresponding inclined surfaces or abutments of the slideways, so that, upon the inward movement of the cover-plate, it is raised and pressed upwardly into contact with the seating with a pressure proportional to the force exerted to move the cover-plate to the closed position. The inclined surfaces or abutments of each series are stepped in position, to permit the free movement of the cover-plate to and from the closure position. Any suitable means may be provided for operating the cover-plate. Thus the cover-plate may be provided on the under side with a rack E, projecting laterally and adapted to be engaged with a pinion F mounted upon a shaft G disposed transversely of the slideways, and adapted to be rotated by a hand-wheel or from any suitable source of motive power.

Quenching Coke.

ASTBURY, E., of Linacre Gas-Works, Liverpool.

No. 20,982; Sept. 22, 1911.

Alluding to this invention, the patentee says: At the present time coke is discharged from gas-retorts into a skip or the like, which is suspended from an elevated track and travelled along the track to a tank containing water, into which the skip of hot coke is immersed, which "causes a lot of objectionable steam, and also causes a considerable quantity of coke to break into small pieces, making much breeze and residue in the tank, and, moreover, the quality and colour of the coke are considerably impaired." These defects are overcome by the present invention, "which effects a considerable saving in the water for quenching the coke; causes less coke dust and breeze and small coke to be made; ensures the coke being of better quality; in large pieces, dry and light, and of good colour; and also causes less residue in the tank after quenching. Moreover, there is practically no escape of steam from the tank in which the quenching is performed."

The tank in which the skip of hot coke is lowered is made with two lids hinged to the sides of the tank and counterbalanced, so that, in their normal positions, the lids stand up open. Means connected to the lids are so arranged that when the skip of hot coke is lowered between the lids into the tank, the skip closes the lids upon itself in the tank so as to practically prevent any escape of steam from the tank during the quenching process. The lids are by preference arranged to meet at the centre of the tank; and the meeting edges are recessed at two or more points to form holes when the lids are closed up, through which holes the suspender of the skip passes. The coke is quenched in the enclosed tank by steam or water or by steam and water combined—the tank by preference containing a certain depth of water from which steam is generated by the immersion of the hot coke therein, and being provided with internal pipes adapted to spray water under pressure or to direct jets of steam on to the hot coke.

Fig. 1 is a sectional end elevation of the coke-quenching apparatus; showing also the suspended skip of coke ready to be lowered into the tank. Fig. 2 shows the skip lowered into the tank and the lids closed thereon while the coke is being quenched. Fig. 3 is a plan of the apparatus.

The skip of coke is suspended by two side rods; and the open topped tank adapted to receive the skip has two lids A B hinged to the top of the sides of the tank, so as to either turn up to their open position (as in fig. 1) or turn down and enclose the skip in the tank as in figs. 2 and 3. The lids are counterbalanced by weights suspended on the ends of chains carried over guide-pulleys and connected to the lids, so as to automatically hold them open, as in fig. 1. Stops are provided to prevent the lids from turning up too far.

The means connected to the lids and adapted to close them by the act of lowering the skip of hot coke into the tank (so that the skip closes the lids upon itself) can be arranged in various ways. In the one illustrated, two wire ropes or chains C D, of proper length, are each suspended in a loop from one lid A to the other lid B; the ends of the chains being connected to the inner sides of the lids, so as to form two loops, the bottoms of which are some little distance above the bottom of the tank. As the skip is lowered into the tank it rests on, and depresses, the chain loops C D, and pulls down, and closes,

Fig. 1.

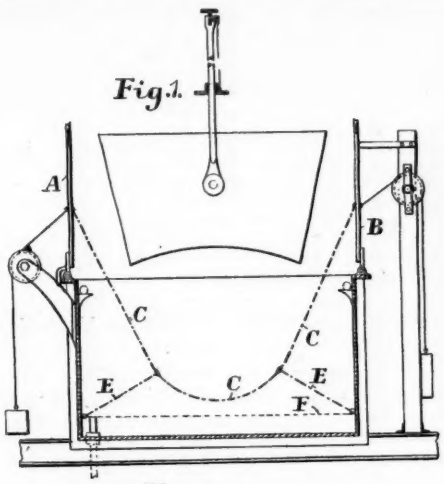


Fig. 2.

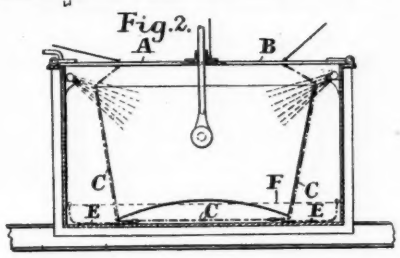
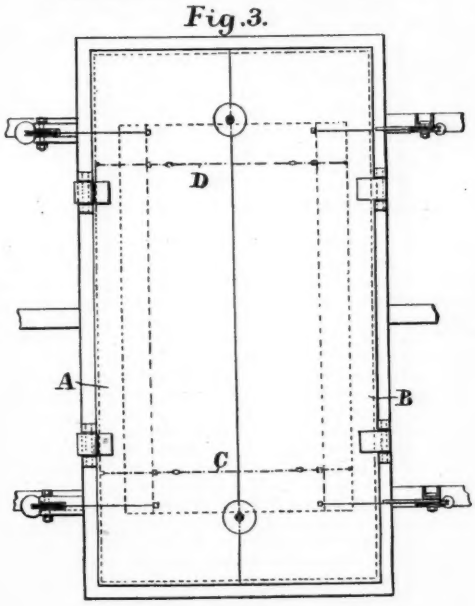


Fig. 3.



Astbury's Coke-Quenching Apparatus.

the lids upon itself. As the skip of quenched coke is being raised from the tank, the lids are by their counterbalance weights raised to the open position shown in fig. 1, where they remain until they are again closed by another skip of hot coke. Each of the chain loops is, at each side near its lower part, connected to the sides of the tank by two short side chains or the like E, which assist in keeping the chain loops in position in case the skip is loaded unequally and hangs with one side lower than the other as it descends into the tank.

In combination with the tank, various methods may be employed of quenching the coke. According to one method, the tank already contains a certain quantity of water—say, up to the water-line F; the water being about 7 or 8 inches deep and automatically maintained by an overflow pipe which projects the required distance up above the bottom of the tank. The steam generated in the quenching of the coke in the

lower part of the skip being enclosed assists in quenching the other portion of the hot coke in the skip above the water level; and, in order to complete the quenching, jets of steam or water are carried along the upper part of the sides of the tank directed on to the skip of hot coke after it has been closed in the tank.

The tank is, by preference, arranged at or near one end of the retort-house, below the elevated track of the telpher; and the cock controlling the water or steam for quenching the coke is so placed that it can be opened or closed by the man riding on and controlling the telpher.

Production of Sulphate of Ammonia.

ENGLAND, G. W., of Scarborough.

No. 26,429; Nov. 25, 1911.

The patentee points out that, as is well-known, commercial sulphate of ammonia is usually made as a bye-product in the manufacture of coal gas by washing the coal gas with a solution containing sulphate of iron, or, as is more usual, by passing the coal gas into sulphuric acid contained in a saturator. In many cases, however—as, for example, in remote places—it is not possible to obtain sulphuric acid at all, or, if obtainable, its cost is so high that the utilization of the ammonia obtained in the manufacture of coal gas is excluded, and the substance is allowed to run to waste.

According to his invention, he proposes to pass the ammonia gas obtained, for example, by distilling with lime or steam or lime and steam, from the ammoniacal liquors resulting from the manufacture of coal gas or like ammonia-yielding substances, into sulphate of iron solution contained in the usual saturator; and he separates the resulting oxide of iron from the sulphate of ammonia solution in any ordinary manner—for example, by filtration or allowing the precipitate to settle and drawing off the supernatant liquid.

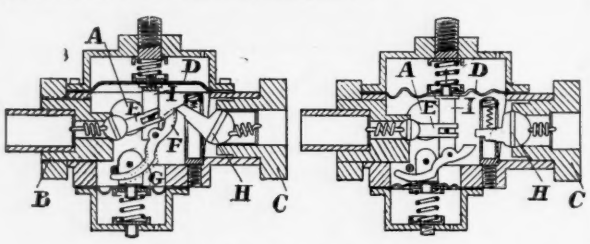
Operating Gas-Burner Valves by Variations of Pressure.

EHRICH AND GRAETZ, of Berlin.

No. 7968; April 2, 1912. Convention date, May 20, 1911.

This device is for lighting pressure gas-lamps from a distance so that the whole or only a portion of the burners in connection with it can be lit or extinguished with the assistance of a pressure (or pressure increase) above the normal gas pressure necessary for the working of the lamps.

The control of the valves opening and closing the individual gas-passages is effected with the assistance of two diaphragms, one of which has for its object to regulate the gas supply to the various burners on the introduction of the normal gas pressure—for example, a pressure 1300 mm. of water; while the function of the second is, on the introduction of a pressure or tension above the normal—that is to say, on the increase of the pressure (say) to 1500 mm. of water—to disconnect from the first diaphragm of the valve controlling the burners which are not to be lit or to be extinguished.



Ehrich and Graetz Gas-Burner Valve Operator.

The vertical sections of the lighter are shown with the movable parts in the closed and open position respectively. A is the gas supply pipe leading to a chamber (containing two diaphragms) provided with the nipples through which the gas is supplied to the various burners. B is in connection with the burners to which gas is to be supplied as long as it enters the chamber at normal pressure; whereas C supplies gas to the burners which are to be extinguished when there is a certain increase in pressure above the normal. The diaphragm D has secured to it a spindle or stem provided with a pin engaged by a fork E connected with the valve adapted to open and close the passage through the nipple B. At the lower end of the spindle there is a pivot pin, upon which rocks a double pawl F G. The arm F is in the path of a lever connected to, or integral with, the valve which controls the flow of gas through the nipple C. The other arm of the pawl is adapted to be engaged by a pin on a spindle or stem on the second diaphragm C.

In the position of the parts first shown both nipples are closed, so that no gas can pass through them to the burners. In this position, the gas entering the chamber containing the diaphragms can only pass through the outlet pipes leading to the pilot flames connected with the burners. If, however, gas under the normal working pressure is supplied through the pipe A, the tendency to force the diaphragms outwardly is resisted by springs tending to press them inwardly. The tension of one spring is so proportioned that, when gas enters at the normal pressure, the diaphragm D is moved further outwardly than the other diaphragm; the tension of the second spring connected to the latter diaphragm being greater than that of the first spring. The second diaphragm, therefore, will be practically unaffected when gas enters the chamber at normal pressure. As the diaphragm D is moved outwardly, the spindle also will be moved in the direction of the arrow, and the valves will thus be opened, as shown in the second arrangement.

As regards the valve, this is operated while the cock is open in the following manner: As the spindle I is moved in the direction of the arrow, the pivot pin of the double pawl F G is moved in the same direction, and, consequently, therefore the pawl. As the latter is thus moved, the arm G will bear against a stop provided in the casing, and as the pivot pin is moved further outward with the spindle I the pawl will be rocked about its pivot, and the arm F will engage the lever of the valve H, turning it into the open position shown. In this position of the parts both nipples B C are open, and the gas is free to flow to the burners, which are ignited by the pilot flames (not shown), which are supplied with gas through the outlet pipe.

Now, if the pressure of the gas be increased above normal, the second diaphragm will also be moved further outwardly; and the spring connected to this diaphragm will be compressed. As the pin connected to the spindle or rod is moved outwardly with the second diaphragm, it will engage the arm of the pawl F G, and force it into contact with the diaphragm; the pawl being rocked about its pivot until the arm F is moved from under the free end of the lever, as shown by dotted lines. The valve H is thus released, and is returned by a spring acting on the lever to its original position, so that the nipple C will be closed. This prevents any gas from flowing to the burners connected with this nipple.

If it be desired to light only the burners connected to the nipple B, the pressure of the gas supplied to the chamber containing the diaphragm is increased to such an extent that the parts are moved into the second position shown; the arm F immediately assuming the position indicated by dotted lines, which allows the valve H to be closed.

Making Used Gas-Purifying Mass Fit for Re-Use by Roasting.

BURKHEISER, K., of Hamburg.

No. 8217; April 4, 1912. Convention date, Aug. 28, 1911.

In his specification, the patentee says: Gas purifying material which has been used has become in an increasing degree a troublesome waste product of gas-works, because its selling value constantly decreases. Endeavours have not been wanting to manufacture sulphuric acid from used gas-purifying mass; and some manufactories of sulphuric acid use this raw product. This working-up of the used gas-purifying mass into sulphuric acid suffers from the disadvantage that, in roasting, impure sulphur dioxide is produced, the oxidation of which to sulphuric acid is comparatively costly.

He proceeds: This process becomes more economical when the residue, after roasting, can be used again for gas purification. Many experiments have already been made in this direction and described in the "JOURNAL OF GAS LIGHTING" for Nov. 19, 1907, p. 566. But it appears from these communications that the absorbing capacity of these masses for sulphuretted hydrogen was extremely variable and never nearly reached the value corresponding to the iron content of the mass. It was proved in all experiments that this varying absorbing capacity was closely connected with the varying content of sulphate of iron in the roasted mass. It was only after the sulphate of iron had been changed into hydrated oxide of iron by ammonia, and the mass neutralized, that there occurred an improvement.

Beside the communications in the "JOURNAL," reference is made to patent No. 20,920 of 1908, which relates to a process in which the gas purifying mass is to be completely revivified by roasting, and that, too, in gas-works themselves, and in connection with the recovery of ammonia. In this process, also, there are formed, as shown by patent No. 22,335 of 1910, sulphates of iron, which seriously affect the absorbing capacity for sulphuretted hydrogen of the gas purifying mass; so that, according to that patent specification, a removal of these bodies by lixiviation is recommended.

It has likewise been proposed to effect the absorption of sulphuretted hydrogen from gas by passing the gas containing the sulphuretted hydrogen through anhydrous oxide of iron heated to 200° or 250° Fahr., thereby changing the anhydrous oxide into sulphide of iron, which is revivified or reconverted into anhydrous oxide, ready for re-use, by driving off the absorbed sulphur.

The process forming the subject of the present invention has for its object the complete avoidance of the formation of sulphate of iron, in order to make the purifying mass completely fit for re-use.

The new process consists in effecting a complete conversion of the iron sulphur compounds into hydrated oxide of iron and sulphur before submitting to the roasting process proper; so that in the roasting process itself only a burning-off of the sulphur takes place. The residue then consists only of hydrated oxide of iron, and contains no salts or acid components. It absorbs immediately (especially after moistening) the sulphuretted hydrogen, at least as well as the original fresh mass.

The sulphuretted hydrogen must consequently reach oxidation by the following steps:—

$$Fe_2O_3 (+ H_2O) + 3H_2S = Fe_2S_3 (+ H_2O) + 3H_2O$$
$$Fe_2S_3 (+ H_2O) + 3O = Fe_2O_3 (+ H_2O) + 3S$$
$$Fe_2O_3 (+ H_2O) + 3S + 6O = Fe_2O_3 (+ H_2O) + 3SO_2$$

When the SO_3 is to be converted into sulphuric acid, the following oxidation must take place.

$$SO_2 + O + H_2O = H_2SO_4$$

The statement that the formation of sulphate of iron occurs when the purifying mass is not fully regenerated to hydrated oxide of iron and sulphur before the roasting, agrees also with the statement of Gmelin-Kraut, "Handbook of Inorganic Chemistry, 1875, III. [I.] p. 330," where it is said that iron sesquisulphide (Fe_2S_3), when glowing hot in air, is converted into iron sulphide (FeS), and this into iron sulphate and sulphur dioxide.

In ordinary gas purifying mass a complete conversion back to hydrated oxide of iron and sulphur is exceedingly difficult, on account of the many admixtures, especially of organic substances, which, on the one hand, are already contained in the raw material, and, on the other hand, are added to it in order to make it porous.

In the present process, it is therefore not only advisable to employ a pure product of high value not adulterated with organic material and the like, but also to employ this highly concentrated unadulterated mass in a finely-divided or porous condition, as described in patent No. 22,335 of 1910 and the like. By these means a complete oxidation or conversion is effected without the formation of sulphate, as also a higher absorbing capacity of the mass thus produced. Furthermore, the purity and value of the sulphurous acid recovered by the roasting

increases with the purity of the mass employed, as also does the purity of the residue to be re-used in the gas purification.

That in the trials that have become known of the roasting of the mass, and its re-use, a complete reconversion to hydrated oxide of iron and sulphur could not have taken place before submitting the material to the roasting process is evident, because in all roasted masses the formation of iron sulphate was always established.

As stated, in the ordinary gas purifying mass with which the above experiments were made a complete reconversion to hydrated oxide of iron and sulphur is very difficult and would at least require an unusually long time. It will be understood, however, that the process in practice has not been employed up to now, as in the usual regeneration of the used mass it is only desired to prevent spontaneous ignition; the re-use of the roasted mass being given up because the initial reaction capability is too small. Consequently, the used gas purifying mass which comes into the market contains, without any exception, sulphide of iron.

A modification of the process consists in heating the mass which contains iron sulphate beyond the roasting process proper, until the vapours of sulphuric anhydride produced by the roasting disappear. The mass treated in this way again attains its full absorbing capacity, especially when it is slightly moistened with a little water.

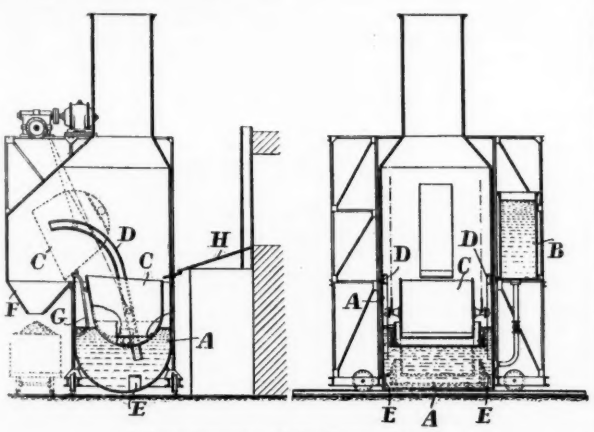
The means of oxidizing or converting the iron sulphur compounds to hydrated oxide of iron and sulphur before the roasting process forms no novel feature of the present invention, and "the oxidation may be effected by any suitable known process."

Quenching Coke.

BERLIN-ANHALTISCHE MASCHINENBAU-AKTIEN-GESELLSCHAFT, of Berlin.

No. 9269; JULY 18, 1912. Convention date Nov. 25, 1911.

The object of the invention is to provide apparatus for quenching coke "of the simplest character possible, reliable in working, and capable of completely quenching incandescent coke, with the use of the smallest possible quantities of water, without the coke becoming too strongly impregnated with the quenching liquid." The invention has further for its object to cool constantly, during the charging, the tank used to receive the incandescent coke, and thus "to protect it from premature destruction."



A Coke Quencher of the Bamag Company.

The coke-quenching apparatus illustrated comprises a frame, adapted to travel, to which is secured the tank A, intended to receive the quenching liquid. This tank is supplied with liquid from a reservoir B; and into it can be dipped the tank C, which receives the incandescent coke—vertically adjustable on lateral guide-rollers moving in two lateral arc-shaped guides D, by means of cables or chains driven by a winch.

The coke-tank is provided with a water-tight bottom, and at a short distance above it, with a perforated bottom. The water-tight bottom extends on both sides beyond the width of the perforated bottom and forms, with the vertical lateral cheeks, pocket-like spaces, communicating with the intermediate chamber formed between the two bottoms. The lower portion of each of the lateral cheeks is provided with an opening which can be closed by a slide. At the lower portion of the tank A, opposite the slides, are arranged stops E. The device described is covered at the top by a box-like casing on which is placed a chimney for the discharge of the fumes generated during the quenching of the coke. On the discharge side of the device is a hopper F, in the neighbourhood of which is provided, in the interior of the tank, a guide-track G. In the construction illustrated, it has been assumed that the coke as it is discharged from the retort passes through a shoot H into the tank C.

The weight and the dimensions of the coke-tank are calculated in such a manner that, before being charged, the tank floats in the quenching liquid—that is to say, it occupies the position shown in full lines. In this position, the lateral cheeks of the bottom of the tank project above the quenching liquid, so that the quenching liquid is cooling the bottom portion of the coke-tank only from the outside, without having access to the interior. When the coke-tank is being charged with incandescent coke, it sinks until the quenching liquid flows over the upper edge of the lateral cheeks and passes through the perforated bottom into the interior of the tank, whereby the coke is quenched. When the tank is fully loaded, it takes up the position shown by dotted lines, in which the slides are opened by striking against the stops E.

When the tank, with the quenched coke, is withdrawn from the liquid by operating the winch, the excess of liquid escapes from the tank, which is tipped, as shown, and discharges its contents through the hopper F on to (say) a truck placed below.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Chemical Clause Inquiry.

SIR,—"Out of evil sometimes comes good. Probably if it had not been for the decision given in the Swansea and West Kent Orders by a Lords Committee, no one would have thought of asking for a Joint Committee."

This is an extract from your last week's leader on the above subject; and it correctly describes the situation. The proposal now before Parliament may, in fact, be regarded as a direct outcome of the continued resistance of the Swansea and West Kent Companies, but for which the parliamentary campaign might have ended with the Birmingham defeat without anything having been done to bring the matter to a final issue, and with a long string of precedents against which it would have been next to impossible to make headway in future years. Certainly, down to that time there had been no suggestion from any source of a parliamentary inquiry. The refusal, however, of the Lords Committee on the Swansea and West Kent Orders to hear any evidence on the general question, coupled with their adherence to precedents already established, must have convinced everyone, both in and out of Parliament, of the futility of further appeals to Private Bill Committees on this subject, and that the only practical alternative, if the full case of the gas industry was ever to be heard at all, was a Joint Committee of inquiry.

May I add that the friends who supported the Companies in their action, including the Gas Companies' Protection Association, did so in the belief that another defeat in Committee was likely to be less harmful to the gas industry than to give up without a struggle the advantage of immunity from the clause which had already been granted by the Unopposed Bills Committee. The result shows, I think, that they were right.

17, *Victoria Street, S.W., Aug.* 10, 1912. CHAS. HUNT.

The Work of the Sulphate of Ammonia Committee.

SIR,—We are glad to see the Chairman's letter duly in print in your issue of Aug. 6; and we think your wide circulation should carry a good word for our propaganda far and wide. Personally, I was sure there must be some tangible improvement in the home consumption on account of the excellent results we were obtaining at lectures all over the country, and in the progress and increase of plot-work in three years from (say) 750 plots to 3000 plots.

I think practically 10,000 tons increase at (say) £14 a ton shows that the intelligent farmer is prepared to use a good article—once he is convinced by lecture and plot-work—even at so stiff a price.

SULPHATE OF AMMONIA COMMITTEE,
W. POPPLEWELL BLOXAM, Scientific Adviser and Manager.

Finsbury Court, E.C., Aug. 8, 1912.

The "Shadowgraph" Method of Testing Gas-Fires.

SIR,—This (as described in the "JOURNAL" for July 30) is certainly one method of detecting whether or not all the products of combustion are escaping up the flue at the moment of testing. Such elaborate paraphernalia is not, however, found in every home; and, unless the test is made when the fire is actually fitted in position, it proves nothing. Moreover, with a doubtful chimney, the test would have to be made over and over again in all conditions of wind and weather.

With regard to the "hygienic" construction of flue outlets, for a year or two past articles have appeared and lectures been delivered galore, on the same subject; but one does not see any new light on it in the article referred to.

Unless a flue outlet is actually restricted, and there is not sufficient room for the products to pass out of it, there can be no possible objection to what is termed the pocket. In fact, it is an advantage and an economy; as convected heat, otherwise lost, is obtained from the canopy, and the products escape quite as easily. With an obstinate flue, which has the same effect as a damper, no amount of "hygienic" nozzle construction will improve a correctly proportioned fire. In my own mind, I have no doubt that—as the competition of electricity becomes keener, and economy in fuel more necessary—we shall see a return of a modification of the old type of gas-fires that are full of pockets for the hot air which is at present allowed to escape up the flue.

I consider that there has been an unfair condemnation all-round of fires that are most economical and at the same time perfectly hygienic, through the incorrect construction of a few types.

Warrington, Aug. 7, 1912. T. W. FLETCHER.

[With all deference to our correspondent, we think he has, in the first paragraph of his letter, missed the fundamental point in the "Shadowgraph" test proposition of the Davis Gas-Stove Company. There is no intention to set up the "paraphernalia" in every home, any more than there has been of instituting in the gas-fire user's house any of the other tests which gas-fire makers (we cannot speak definitely for all) conduct at their works to prove the efficiency of their new designs, and to certain of which tests the "Shadowgraph" is put forward as a ready and reliable alternative. The logical deduction from Mr. Fletcher's opening argument is that any tests made at the makers' works for the purpose in view are of no real value. From such a suggestion, we should most strongly dissent, as we also do to the remark that "unless the proposed test is made when the fire is actually fitted in position, it proves nothing." What it does prove at the gas-fire makers' works is that a fire that will (under the conditions described) pass the test is a fire

that is more likely to act as it should do when fixed in position in the user's house than one that will not pass the test. Which conditions would give the better promise of success in producing satisfaction—a "doubtful" chimney and a fire which will not pass the test, or a "doubtful" chimney and a fire that will pass the test? What we miss from Mr. Fletcher's letter is a response to our invitation to anyone interested to criticize the test in order to ascertain whether other brains can point to any technical flaws in it that affect its value for the purpose of seeing whether a gas-fire meets with the standard that the Davis Company suggest for adoption, not only by themselves but by other makers.—ED. J.G.L.]

Alliance and Dublin Consumers' Gas Company.

SIR,—In my last letter, I showed that this Company was in receipt for 1911 of 3s. 1·74d. per 1000 cubic feet of gas sold—an excess over the Metropolitan Companies of 9·53d. per 1000 cubic feet. This is bad for the stockholder and the consumer, as, owing to the high price, it retards progress and consequently keeps back the dividend; for unless an undertaking advances, gas cannot be sold cheaply. Therefore the sliding-scale advantages are lost, and the market value of the ordinary stock depreciated.

Now, it would not be so serious, from a stockholder's point, if the 9·53d. was retained; but before reaching the total return per 1000 cubic feet, we find this extra revenue has dwindled to 4·68d. What has become of it? By a brief analysis, the following is the picture.

Comparison with Metropolitan Companies, per 1000 *Cubic Feet of Gas Sold.*

	Pence.		Pence.
Excess revenue from gas . .	9·53	Deficits—	
		Meter and stove rents, also miscellaneous	2·70
		Coke and breeze	1·36
		Liquid products	0·79
			4·85
		Net surplus	4·68
	9·53		9·53

Here we get on the revenue side of the accounts an excess from gas revenue reduced by nearly 4¾d. per 1000 cubic feet by other sources. I cannot criticize with any degree of accuracy the 2·70d. from meter-rents, &c., as they are items which vary in the detail credited. But supposing they are on all-fours with the Metropolitan Companies, there is a large difference to explain.

With coke and breeze, there is a difference of 1·36d.; and here one would expect Dublin to do much better with respect to coke than the Metropolitan Companies, and at least equal the Suburban Companies. Take, for instance, the Croydon Company, with 6·63d. per 1000 cubic feet revenue from coke; the South Suburban Company, with 7·90d.; and the Richmond Company, with 8·06d.; against Dublin's 4·59d.—and this in a city where coke is imported. Surely there is some philanthropy, or the best prices are not secured for coke. Then liquid products are 0·79d. behind; and this is principally on ammonia.

It is admitted that the proportion of carburetted water gas has a bearing on the return from residuals. But when comparison is made with the net cost of coal and oil, the full significance of the point will be realized. The net cost of coal and oil for the Metropolis was 2·59d. per 1000 cubic feet, against 8·92d. for Dublin—a difference of 6·33d. per 1000 cubic feet of gas sold. Whether it be due to one factor or the other, the net result determines the point, and leaves us face to face with 6·33d. deficit on fuel account, which more than absorbs the net surplus of 4·68d. on revenue. I suggest that the close proximity to England and the Lancashire and North Wales coalfields, together with similar facilities for importing oil, *plus* a good home market for residuals, should yield a net figure not exceeding 3d. per 1000 cubic feet of gas sold, instead of 8·92d.

I have examined the other expenses; and while I find a net saving under manufacture (excluding coal and oil) of 1·81d. per 1000 cubic feet, such saving is on the accounts one would prefer that it should not be. For instance, wear and tear is down 1·10d., and it is indisputable that well-managed undertakings do not stint this account. Salaries are up 0·19d., and wages down 0·61d. Purification is less by 0·29d. In distribution, there is a net saving of 2d., of which, again, the principal economy is on an account where one would expect it otherwise—viz., stove account. Management displays an increase of 0·90d., of which 0·62d. is for directors, auditors, and salaries; collectors being less by 0·12d., and stationery up by 0·40d.

Thus, excluding coal and oil, and such items as rates and taxes, rents, law charges, bad debts, depreciation of leasehold lands, testing-station, and profit-sharing and superannuation, we get a saving of 2 91d., of which 2·9d. is on the very important accounts of works wear and tear and stove repairs—economy not to be made too much of. So that the sum and substance is that on revenue there is a net surplus of 4·68d., on expenditure a saving of 2·91d.—in all, 7·59d., of which 6·33d. is lost on net coal; leaving but 1¼d. per 1000 cubic feet of the extra 10d. charged to the gas consumers of Dublin and district.

I shall not be able to submit further criticisms until the end of the month. Meanwhile, I hope others will join the fray.

Aug. 3, 1912. NONULUS.

An exhibition of special interest to Medical Officers of Health and others will be opened on the 26th inst. at the offices of the Society of Medical Officers of Health, No. 1, Upper Montague Street, Russell Square, W.C. A special section will be devoted to the heating and lighting of sanatoria, dispensaries, and institutions generally; and various economical cooking appliances designed for catering for large numbers will be submitted for inspection, together with laundry fittings, and various types of disinfectors.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The Residual Products Question.

Last Tuesday, a message was received from the Commons that they had come to the following resolution, to which they desired the concurrence of the House: "That it is expedient that a Select Committee of five members of the Commons be appointed to join with a Committee of the Lords to consider whether any, and if any what, restrictions should be imposed on gas authorities with respect to the purchase and manufacture of the residual products resulting from the manufacture of gas by other gas authorities, or of other chemicals."

Next day, when the House rose for the recess, the following Bills received the Royal Assent:—

Annfield Plain and District Gas Bill, Arbroath Corporation Gas Order Confirmation Bill, Ashborne Urban District Council Gas Bill, Bawtry and Tickhill Gas and Water Bill, Bedwellty Urban District Council Bill, Belfast Water Bill, Birmingham Corporation Bill, Bognor Gaslight and Coke Company (Electricity) Bill, Bordon and District Gas Bill, Brighton and Hove General Gas Bill, Brodsworth and District Gas Bill, Christchurch Gas Bill, Derwent Valley Water Bill, Dover Corporation Bill, Dunbar Water Order Confirmation Bill, Fleetwood Gas Bill, Fylde Water Board Bill, Gas and Water Provisional Orders Bill, Gas Companies (Standard Burner) Bill, Glasgow Corporation (Water) Bill, Herne Bay Gas Bill, Houghton-le-Spring District Gas Bill, Ivybridge Urban District Water Bill, Keighley Corporation Bill, Lea Bridge District Gas Bill, Llanelly Rural District Water Bill, Local Government Provisional Orders (Gas) Bill, Maidenhead Gas Bill, North Middlesex Gas Bill, Scunthorpe Urban District Water Bill, Shipley Urban District Council Bill, Southgate and District Gas Bill, South Suburban Gas Bill, Staffordshire Potteries Water Bill, Swanage Gas and Water Bill, Swansea Corporation Bill, Tavistock Urban District Council Bill, Tendring Hundred Water and Gas Bill, Wakefield Gas Bill, Wandsworth, Wimbledon, and Epsom District Gas Bill, Windermere District Gas and Water Bill, Woking District Gas Bill, York United Gas Bill, Ystradfellte Water Bill.

HOUSE OF COMMONS.

Monday, Aug. 5.

GAS AUTHORITIES (RESIDUAL PRODUCTS).

At the time of private business,

The CHAIRMAN OF WAYS AND MEANS (the Right Hon. J. H. Whitley) moved the following resolution: "That it is expedient that a Joint Committee of Lords and Commons be appointed to consider and report whether any, and if any what, restrictions should be imposed on gas authorities with respect to the purchase and manufacture of the residual products resulting from the manufacture of gas by other gas authorities, or of other chemicals. That a message be sent to the Lords to communicate this resolution, and desire their concurrence." He said: This motion, which stands on the paper in my name, requires, I think, a word or two of explanation. It deals with a subject which has been a matter of contest on a number of Private Bills during this session; and that contest, to all appearance, is likely to be renewed in the next and future sessions. The Chairman of Committees in the other House and I have come together, and we have come to the conclusion that it would be very greatly in the interest of both parties, and a great saving of expense, if the matter was considered by a Joint Committee, instead of having the subject a matter of contest on individual Bills. That is the reason why the proposal is made to this House that a Joint Committee should be set up before which the contending parties could put forward their case, and that we may have a report from that Joint Committee for the guidance of Private Bill Committees. That is why I move this motion.

Mr. JOYCE (Limerick City) asked whether, if such a Committee were set up, they would have power to recommend other legislation to prevent municipal authorities who at present, under Acts of Parliament, have power to carry on the work mentioned from doing so. Would this operate against them in any way?

The CHAIRMAN OF WAYS AND MEANS: It is a matter of some doubt how far these existing powers of gas authorities go; and that is how the question has arisen. Some Private Bill Committees during this session have inserted clauses of a retrospective character, placing restrictions upon the purchase of residuals by gas authorities; and therefore it is necessary that this Committee should inquire into the whole question.

Mr. BOOTH (Pontefract) asked whether it was intended that members of the Joint Committee should be nominated by the Government, by the Committee of Selection, or by the Chairman of Ways and Means.

The CHAIRMAN OF WAYS AND MEANS replied that the succeeding motion would, of course, be made by himself.

Mr. JOYCE inquired if the object of the motion was to produce uniformity among all classes that produce gas, whether companies or municipal corporations.

The CHAIRMAN OF WAYS AND MEANS replied that it was.

Mr. COTTON (Dublin City): I should like to ask the right hon. gentleman, supposing rules were laid down by the suggested Committee, would they apply to local authorities as well as companies?

The CHAIRMAN OF WAYS AND MEANS: The words "gas authorities" include both companies and local authorities that have statutory powers.

Mr. MITCHELL-THOMSON (Down, North): Is it suggested that the Joint Committee should take evidence?

The CHAIRMAN OF WAYS AND MEANS: Yes; it is suggested that both parties to the contest should appear before the Joint Committee by Counsel, if they desire.

Mr. JOYCE: Whatever way the Committee report, I take it legislation would be necessary before any change was made?

The CHAIRMAN OF WAYS AND MEANS: It would mean that in all probability the practice of Private Bill Committees would follow the recommendation of the Joint Committee.

Mr. JOYCE: And come up for revision in this House?

The CHAIRMAN OF WAYS AND MEANS: Yes.

The motion was then put and agreed to; and it was ordered, on the motion of the Chairman of Ways and Means, that a message should be sent to the Lords to communicate the resolution to them, and desire their concurrence. [As recorded above, the message was duly received in the Upper House.]

REFUSAL OF AN ELECTRIC LIGHTING ORDER.

Lord WOLMER last Wednesday raised the question of the refusal of the Board of Trade to sanction an Order to the Newton-in-Makerfield Urban Council to enable them to generate and distribute electricity in their area. He said this was a matter not only of purely local interest, but of some national importance, because more than forty Urban District Councils had taken it up with some keenness, and had petitioned their representatives in the House on the subject. In 1903, the Newton Council obtained an Order of the kind now sought; but it was not then brought into operation because at the time the Council were doubtful as to whether it would pay. The Order was withdrawn by the Board of Trade in 1909. The reasons given by the Board for refusing again to grant the Order appeared to be that, in their opinion, it would, first, not be a paying proposition, and, secondly, that there was no reason why the Order should be granted again when it had once been given and not used. Honourable members might ask what had happened since 1903 to lead the Council to suppose that the scheme would now be a paying one. The population of the district had increased largely. One or two new works had settled there, and—more important than anything else—the manufacture of electricity was now a great deal cheaper than it was six or seven years ago. It was this fundamental fact which had entirely altered the situation, and which the Board of Trade refused to recognize. The Board alleged that there was not a sufficient guarantee that a definite quantity of electricity would be taken if the local Council conducted the manufacture. The Vulcan Foundry, the largest works in the district, were prepared to take 2 million units per annum, and other works would take a supply. The Property Owners' and Shopkeepers' Association in the district had passed resolutions approving of the Council's application; and he had with him a large petition signed by several hundred ratepayers. The Council were willing to take a poll of the ratepayers on the subject. Why should the Board of Trade step in and stop the ratepayers supplying their own electricity if they were anxious to do so? The desire of the Council was a very reasonable and proper one. The district was growing, and whoever obtained a monopoly for manufacturing electricity in it would do a very fine piece of business; and it was much better that the local authority should make the profit than that it should go to some individual firm. He was in favour of municipal trading in matters of this sort. If the Council were prevented supplying electricity at this juncture, some of their best possible customers might be lost, as the Vulcan works would set up plant for themselves failing a municipal undertaking, and the London and North-Western Railway, at their Newton premises, were also hesitating as to how they would get their supply. If the Order were granted, the whole matter would have to be gone into at a Local Government Board inquiry in order to raise the necessary loan. It was not an extravagant demand to ask the Board of Trade to grant an Order which they agreed upon nine years ago when the circumstances were far less favourable. The almost unanimous desire of the people of Newton ought to be given effect to.

Mr. J. M. ROBERTSON, the Parliamentary Secretary to the Board of Trade, congratulated Lord Wolmer on his pertinacity, but added that the Board of Trade could not allow mere pertinacity to override principle. The fact that the previous Order had not been put into operation by the Local Authority showed that there was no real demand for electricity. Lord Wolmer had asserted that the Council had every facility for the manufacture of electricity; that was not so. There was no facility for a good and cheap water supply, which was very important in these matters. The Local Government Board absolutely concurred with the Board of Trade as to the inexpediency of granting an Order in this case. The noble Lord's argument amounted to this—that the members of the Council were business men, and that the inhabitants supported them in their desire for this Order, and why did the Board of Trade intervene to prevent them? The Board of Trade interfered by right of its statutory powers. Lord Wolmer was a warm advocate not only of municipal trading, but of speculative and unrestricted municipal trading; and if his arguments were followed to their logical conclusion, municipal trading of the most speculative kind would be in the power of any local authority in the country. So long as the Board of Trade had powers of supervision, they would try to employ them in a rational way. Lord Wolmer complained that the Board of Trade did not say what guarantees they referred to. It was not the business of the Board of Trade to draw up a table—a kind of reckoner for municipal authorities—telling them the exact amount of support they needed for any scheme they had in hand. A deputation came from the Newton Council to the Board of Trade when the Order was first refused, and in the course of discussion he (Mr. Robertson) put this question to the Consulting Engineer: "And if the Vulcan Foundry failed, will you not practically be derelict, because you are depending very substantially on one big customer?" The answer was that if terms could not be arranged with the Vulcan Foundry there would be no proposition to spend £26,000 or anything like this sum. He (Mr. Robertson) then put the question that the Council were staking their municipal expenditure on one consumer; and the answer was: "If that consumer were not obtained, the expenditure would be very considerably reduced." The House would see that this was an entirely speculative matter. There was a cheap gas supply in the district; and there was no general demand for electricity. If, however, there was at any future time an indication that a certain number of consumers were prepared to take electricity, the Order might be re-applied for. Under the circumstances he had described, there would be considerable risk of insolvency; and it was the duty of the Board of Trade to prevent any such risk being taken.

The Lighting of the Terrace of the Houses.

Last Tuesday, Mr. Patrick O'Brien asked the honourable member for St. George's-in-the-East, as representing the First Commissioner of Works, whether his attention had been directed to the insufficient lighting of the terrace of the Houses of Parliament; whether he was aware that the sort of burners in use are probably a quarter-of-a-century old, and that, in the opinion of gas engineers, these antiquated burners consume more gas than the up-to-date burners which give an illuminating power of 50 candles; and whether he would see that the best burners were put into the terrace lamps. Mr. Wedgwood Benn, in reply, said the First Commissioner had no reason to suppose that the House generally desired greater illumination on the terrace than that now furnished; but he was quite prepared to meet the wishes of members in the matter. The saving in gas by substituting incandescent burners for those now in use would, however, not be very great.

Financial Position of the Athlone District Council.

Mr. RONALD M'NEILL asked the Chief Secretary for Ireland, a few days before the rising of the House, whether his attention had been called to the proceedings of the Athlone Urban District Council on the 24th of July, when the question of the Council's debts was under discussion, and it was stated by the Chairman that the Council had been presented with an account for coal supplied to them amounting to £2000, of which they were unable to pay more than £200, and that they were threatened with legal proceedings by the contractors if the debt were not paid within a week; whether he was aware that it was also stated that a further sum of £2800 was owing for gas, that the Council were unable to pay interest on its debt, and that the rates could not be collected, and that it was decided to apply to the Local Government Board for a loan to enable the Council to meet its current liabilities; whether he could say what was the total indebtedness of the Council; and whether the Government intended to sanction a loan for the purpose of paying the tradesmen's bills of the Council.

Mr. BIRRELL replied that the facts were as stated in the question, and that an application for sanction to a loan to meet the Council's liability to the coal contractors had been received by the Local Government Board. The Council were informed on the 16th of June, 1911, in connection with a similar application, that the Board had no power to authorize borrowing for such a purpose; and they were now referring the Council to the terms of that letter. There was no information available as to the other matters referred to in the question; and the Board had no precise particulars as to the total indebtedness of the Council.

Viscount HELMSLEY inquired whether the Local Government Board would cause inquiry to be made into the finances of the Council.

Mr. BIRRELL said the Board were considering the state of the case.

LEGAL INTELLIGENCE.

Alleged Nuisance from a Gas-Producer Plant and Engine.

In the Chancery Division, last Tuesday week, Mr. Justice Joyce had before him the case of *Payne v. John Marlow and Sons*, on a motion for an injunction to restrain a nuisance which Mr. Hughes, K.C., said was very serious and prejudicial to the health of the plaintiff and his wife. The defendants carried on a large business at Northampton; and the nuisance was caused by fumes from a gas-producer plant and a gas-engine close to plaintiff's house. For the defendants, Mr. Younger, K.C., remarked that the trouble was alleged to have been going on since April 22, and now plaintiff came on short notice for an injunction. There were 500 people employed by the defendants, and it was a very serious matter for them. The gas-engine was put in at the beginning of the year, and had been worked ever since. When plaintiff complained, defendants called in Mr. Swinburne, and informed the plaintiff that they were doing so. He was instructed that Mr. Swinburne went down and inspected the premises with the plaintiff. Now the plaintiff brought on this motion, before Mr. Swinburne had an opportunity of making any report. The defendants were not endeavouring to take a high hand in the matter. There was one period when they took their gas from the Gas Company; and the plaintiff said the alleged nuisance was not so great then. If the motion stood over to the Second Vacation Court on Aug. 15, defendants were willing to meanwhile take their gas from the public supply at Northampton. Mr. Hughes said this was what he was going to suggest. The nuisance could be diminished a great deal in this way, though the exhaust from the gas-engine would still cause a nasty smell. Mr. Younger promised that they would make arrangements to take the public gas as soon as possible; and the motion accordingly stood over until Aug. 15, for the Vacation Judge to deal with it.

Gas to Supplant Steam Power at the Chorley Water-Works.—The Chorley Rural District Council have decided to substitute duplicate gas-engines and pumps for the existing steam-pump at the Heath Charnock and Anderton station; the estimated cost being £600. The present machinery, which was put down in 1899 at an expenditure of £463, has been found to be wasteful in fuel, and its capacity limited to 5000 gallons per hour. The replacing of the steam plant by gas-engines will, it is estimated, result in reducing working costs in fuel, and one assistant less will be required. There is also the further advantage that, in the event of repairs, the engines being in duplicate, no cessation of the water supply will be entailed.

MISCELLANEOUS NEWS.

GAS SUPPLY OF PARIS.

Annual Report of the Gas Company.

The Directors of the Company formed to carry on the gas supply of Paris in association with the Municipality, presented their fourth report at a meeting of shareholders recently held. It covered the twelve months ended the 31st of December last; and the following are its principal features.

The quantity of gas sent from the works in the period referred to was 452,545,014 cubic metres, or nearly 16,000 million cubic feet; being an increase of 10,040,639 cubic metres, or nearly 354½ million cubic feet, on the output in 1910. The day consumption reached 202,396,590 cubic metres, or close upon 7144·6 million cubic feet; being an increase of 214,430 cubic metres (7,570,000 cubic feet). The quantity of gas sold was 428,465,973 cubic metres (15,124·8 million cubic feet), or 1·39 per cent. more than before. The revenue from the sale of gas amounted to 83,791,151 frs. (£3,351,646), or an increase of 1·4 per cent. The number of consumers on the books at the close of the year, compared with the year 1910, was—

	Ordinary.	Free-Fittings.	Total.
1910.	358,468	295,072	653,540
1911.	371,588	302,148	673,736
Increase. . .	13,120	7,076	20,196
Do. per cent. .	3·66	2·39	3·09

For the public lighting of the city there were in use on Dec. 31 last 53,958 burners, compared with 53,850 at the close of 1910. They were divided as follows: Ordinary, 1240; incandescent, 52,718—an increase of 1 of the former and 107 of the latter. The number of installations of compressed gas for the public lighting continues to increase. From 104 light-centres, representing an illuminating power of 240,000 decimal candles, at the close of 1910, there was an augmentation last year to 368, equal to a million candle power. Owing to the advantages of this method of lighting, the Municipal Council have lately decided to have further installations in important places in the city.

The number of rising pipes for the supply of tenements in use at the close of last year was 56,048, against 52,219 on Sept. 1, 1907, when the Company took possession—an increase of 3829; the consumers taking their supply from them numbering 543,833, compared with 449,662 at the earlier date. The former figures are equal to 80·71 per cent., and the latter to 78·66 per cent., of the total number of the consumers. The increase in the year was 19,313. The length of mains laid up to Dec. 31 last was 1,928,433 metres, or about 2,121,276 yards; being an increase of 51,676 metres, or 56,844 yards, in the twelve months. Since the Company have been in possession, the mains have been extended by 188,225 metres, or 207,047 yards.

Coming to the financial portion of the report, it is stated that, in addition to the 83,791,151 frs. (£3,351,646) received from sales of gas, the residuals, meters, fittings, &c., produced 22,509,629 frs. (£900,385); making together 106,300,780 frs. (£4,252,031). The expenses for the year, including 1,586,842 frs. (£63,474) taken by the Company by way of remuneration, came to 84,293,384 frs. (£3,371,735); so that there was left a balance of 22,007,397 frs. (£880,296), which passes into the hands of the Municipality, compared with 23,976,450 frs. (£959,058) for the year 1910—a drop of 1,969,397 frs. (£78,762). It is explained that this decrease is the result, to the extent of more than 85 per cent., of the larger payments for retiring allowances consequent upon the improved conditions under which the Company's servants work by virtue of the arrangement between them and the Municipality by which they are placed on a par with the municipal employees. In addition to this, the cost of coal went up during the past year owing to the advance in the cost of carriage resulting from the railway and coal miners' strikes. These extra charges would have pressed more heavily had it not been for the favourable prices obtained for residuals.

With regard to the sale of gas, the Directors call attention to the increased use of high-pressure lighting, which is employed not only for the public thoroughfares, but also in large establishments, halls, cafés, and warehouses. For several years, the utilization of gas for the heating of bakers' ovens has been studied, and it has now been practically applied. It is found to present numerous advantages which should lead to its extended use. The Directors are considering the possibility of developing the use of gas for culinary purposes. The introduction of prepayment meters into small dwellings is beginning to produce good results.

The construction of new works to meet the increased demand for gas has been retarded by the delay in getting the necessary money from Parliament. Now, however, that the City has raised a loan of 205,000,000 frs. (£8,200,000) for gas purposes, extension work can be actively prosecuted. The Directors hope that, should no disturbing event arise, the producing plant will in a few years be brought into a condition to satisfy all requirements for a long time to come.

This reference to new works leads the Directors to refer to those carried out last year, in which period the first instalment was finished. The works at Le Landy, of which the productive capacity is about 24¾ million cubic feet per day, are considered to be deserving of attention for the unity of their conception and the homogeneity of their arrangements. Two new holders, each capable of containing 5¼ million cubic feet, have, as was recently mentioned in the "JOURNAL," been brought into use; and a third, of similar size, has been commenced. Adjacent to these works, on a spacious area acquired by the Company, the first section of plant for the treatment of ammoniacal liquor has been completed. On this ground it is intended to erect gas-works of similar capacity to those at Le Landy, from which they will be separated only by the high road from Paris to Calais. At La Villette, the first installation of five-ton chamber ovens, of a daily capacity of about 5¼ million cubic feet, will be finished towards the close of the present year, as will also the auxiliary plant. The trunk mains were extended in various directions during the period covered by the report. The outlay on works in the twelve months was 13,846,360 frs. (£553,854); and the Municipal Council have authorized a new series to cost 72,117,200 frs. (£2,884,688). Further, they have agreed to the Company's proposition to erect large new works at Orly, in the south-east suburbs of Paris, close to the Seine and to a line of railway. Authority has already been given for the acquisition of the necessary land.

The Directors conclude by expressing their satisfaction at informing the shareholders that the Prefect of the Seine, the Chairman and members of the Gas Committee, and several members of the Municipal Council paid a visit early in the year to the Clichy and Le Landy stations of the Company, where the important improvements effected, both in the manufacturing operations and in the conditions under which the men do their work, were highly appreciated.

The report and accounts were unanimously adopted; and a dividend at the rate of 5½ per cent. per annum was declared.

TOTTENHAM AND EDMONTON GAS COMPANY.

The Annual General Meeting of the Company was held last Saturday week, at the Works, Willoughby Lane, Tottenham—Mr. CORBET WOODALL in the chair.

The Secretary (Mr. E. Topley) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

HARMONY AND DISCORD.

The CHAIRMAN said it was his pleasant duty once again to move that the report and accounts be received and adopted. It was gratifying to be able to say that the period under review, though it was, as the proprietors were aware, one of peculiar difficulty and disturbance of trade, had yielded results equal if not superior to any that he had had the pleasure of laying before them in the past. He put in the forefront of the causes for congratulation, the fact that the half year had been one of undisturbed harmony—that the relations of the Company with consumers, with the local authorities, and with the employees had been terms of peace and friendliness, and more especially, he would say, was this the case with regard to the employees, from whom they had had repeated evidence of contentment and goodwill. All deplored the strikes which had put their sad mark on the first half of the year; but it was not their place to attempt to allocate the responsibility for them. That these strikes were unnecessary, as well as harmful, he said emphatically each side, confident of the reasonableness of its claim, should have been willing to refer its case to impartial judges, and, as in all other business transactions, should have accepted, and have been bound by, the awards. As it was, men had squandered the savings of years, and had suffered in themselves and their families to a degree which, in many cases, would impair their vigour and usefulness for a lifetime. The country had lost trade, which, to a large extent, would never be recovered; and this hit the whole of the community, rich and poor, workers and employers alike. Another result of a strike might be, and often was, a large and abnormal increase in the price of the commodity affected, which increase the public must pay. The inevitable result, however, was a check in demand, accompanied by extended supply, with a consequent fall in prices. Thus the amount gained during the short period of inflated prices was soon lost, so that neither side in the end were gainers—probably both were losers. The see-saw of prices was, therefore, harmful, but apparently inevitable under present conditions. They might, as they sincerely did, hope this would soon be amended.

A LOW CAPITAL ACCOUNT.

The accounts submitted for the past six months, he might say broadly, were eminently satisfactory. Dealing first of all with the capital account, they had added to it £6462. The increase of gas sold being 84 million cubic feet, the capital expended was reduced to £402 per million; and it was safe to prophesy that, by this time next year, it would be under £400. The total capital charges for interest and dividend now stood at 5·62d. per 1000 cubic feet of gas sold. The reserves, including the carry-forward, amounted to £90,910; and this accumulation of funds rendered it unnecessary to raise more capital, though they had overspent on this account £52,358. They had not even a loan from their bankers.

WORKING RESULTS.

The cost of raw material was greater by £1535; but the residuals yielded £4191 more. So that the net result was that 93 million cubic feet more gas had been produced with a lessened expenditure of £2656. The gas made per ton of coal carbonized reached 12,785 cubic feet—a few feet more than during the Christmas half year, and 590 feet per ton more than in the corresponding half of last year. The carbonizing wages were down to the lowest amount that they had yet touched—viz., 1·32d. per 1000 cubic feet. The fuel account was also remarkably good—2·58 cwt. of coke per ton of coal carbonized. This was the lowest quantity on record. The net cost of coal and oil was reduced from 6·41d. to 5·11d. per 1000 cubic feet. The unaccounted-for gas was a little over 3 per cent.

THE STRIKE AND INCREASED BUSINESS.

The strike of coal miners found the Company well provided with stock; and they felt strong enough to invite consumers to make the utmost use of the Company's resources. That they largely did so was evidenced by the fact that there had been the exceedingly satisfactory increase of 10·36 per cent. in the quantity of gas sold. This was due not so much to new consumers as to a large increase in the quantity of gas used by individual consumers—the average individual increase being for the six months by ordinary meter 1221 cubic feet, or 4·58 per cent. over the corresponding period of last year, and by coin meter 634 cubic feet, or 8·43 per cent. During the six months, the number of consumers increased by 5·6 per cent.; but the cookers, fires, and heating appliances on rental increased by 17·65 per cent. The increase was no doubt largely due to the demand caused by the strike—to the adoption of the fuel that the gas consumers felt they could count upon; but it was pretty safe to say that gas-fires being once installed, their convenience would ensure their permanent use. This department of the

business was greatly assisted by the work done at the district show-rooms. Two fresh show-rooms had been opened during the past half year—one in the very busy thoroughfare, High Road, Wood Green; the other at Muswell Hill. Both were yielding satisfactory results.

POINTS FROM THE REVENUE ACCOUNT.

Concerning the revenue account, in February last, he commented on the reduction in the cost of lighting and repairing public lamps. It would be remembered that he then explained that they had to a large extent adopted automatic appliances for this purpose. Last half year there was a greatly increased expenditure on this item. The explanation was that the Company had spent, in consultation and agreement with the local authorities, a large amount in improving the public lighting, the cost of which would be deferred over a term of half years. There was one item of increase—that of rates and taxes—which was explained entirely by the extra profits, and the consequent increase in the amount of income-tax. Although the price of gas had been reduced by 1d.—representing £3700 in the half year—the revenue from the sale of gas had been increased by £5439. It was noteworthy that the revenue from the Company's property on consumers' premises—that was, meters, cookers, heating appliances, gas-fittings, and gas-engines—was now almost sufficient to pay the whole of the capital charges for interest and dividends. For the past six months, this revenue was £20,740, and the charges for capital were £21,005.

PRICES FOR RESIDUAL PRODUCTS.

Residuals showed an increase of £4190, due principally to a rise in the price obtained for coke of 1s. 5·7d. per ton, and to a very considerable increase in the value of tar, both on the make per ton and the price per gallon; these being 11·18 gallons, and 2·24d. respectively. The price of sulphate was up 15s. 7d. per ton more than in the corresponding half of 1911.

SOLID CO-PARTNERSHIP EFFECTS.

Co-partnership pursued its prosperous way. The bonus for the year increased ¾ per cent., because of the reduction in the price of gas; and it was now 7⅛ per cent. per annum upon the wages. The amount of stock held by co-partners had increased by £7500, or by 23·8 per cent. The balances held for co-partners on trust account had increased by £2695, or an increase of 1·4 per cent. The balances held for co-partners on withdrawable account was higher by £5053, or 18 per cent. Taking the value of the stock at £117, the total funds held by the Company's employees as co-partners, on June 30, reached the sum of £16,523—an average of £28 per man.

NATIONAL INSURANCE.

Under the National Insurance Act, the Directors were faced with the alternative of dissolving the Provident Society, which had been established for 31 years, or its formation into an Approved Society under section 25 of the Act; one of the conditions of the latter course being the confirmation by deed of that which had always been a condition under the rules—the guarantee by the Company of the Society's solvency. The benefits provided by the Society were much greater than under the Act; and it seemed an opportunity for the furtherance of the attachment to the Company of its employees. The Directors decided to recommend the formation of the Society as an Approved Society. At a meeting of the members on July 3, a vote taken by ballot was unanimous in favour of this course; and a subsequent vote at a meeting of the whole body of employees cordially endorsed it. The necessary steps had been taken to obtain the approval of the Society, though the formalities were not yet quite complete. It was satisfactory that, whereas only 164 employees were members of the old Society, over 600 had applied for membership of the new; and they were thus attaching to the Company by a new tie 450 of its men.

"GOOD WINE NEEDS NO BUSH."

He (the Chairman) did not think there was anything further to say with regard to the working of the half year. He thought the Company were in the position which was metaphorically explained by the words "Good wine needs no bush." The accounts themselves, the growth of the reserves, and the increase of the dividend, were distinct marks of prosperity. He had pleasure in moving the adoption of the report and accounts.

The DEPUTY-CHAIRMAN (Sir Daniel F. Goddard, M.P.), in seconding the resolution, said he was sure no further words were needed to commend it to the support of the proprietors. They were all engaged in an undertaking which was eminently prosperous in every department. Although he had an intimate acquaintance with gas-works almost from his very birth, he was always struck with amazement, whenever he went over the works and inspected them, at the rate of the progress of the new developments which were constantly in evidence. Gas companies were no longer mere undertakings for the manufacture of gas. The business extended far beyond this. In the report, it would be seen that the cooking and heating stoves in use in the district now numbered over 30,000. They could not supply 30,000 gas cookers and fires without requiring an enormous amount of repair and attention of all kinds. He thought that anybody who did not know what a gas company had to do in regard to these developments must always be astonished at the branches which were constantly growing and extending, in order to meet the requirements which the manufacture of gas had called into being. In this respect the proprietors of the Company could congratulate themselves upon being thoroughly up-to-date. Their Engineer and Manager (Mr. A. E. Broadberry) seemed to have a great eye for looking forward to the requisite developments, so as to carry on this great industry; and he certainly did it with remarkable success.

The motion was unanimously carried.

HIGHER DIVIDEND AND A PREDICTED FURTHER REDUCTION IN PRICE.

Mr. HENRY BAILEY said he had much pleasure in proposing the next resolution with regard to the payment of the dividends recommended by the Directors—dividends at the rate of 7¼ per cent. per annum on the "A" stock, and 5¾ per. cent. on the "B" stock, both less income-tax. The proprietors had seen the report and accounts; they had heard the Chairman's speech; and there could not be better recommendations of the dividend. By the last 1d. reduction, they had given the consumers £3700; while the proprietors only took the small sum of £355. This might not seem sufficient to some of the proprietors; but, unfortunately, the Directors could not give them more than their statutory powers allowed them to do. The increase in the dividend was ⅛ per cent. above that declared last year; and this increase appeared to have become almost a usual thing year by year. They could not promise that it would continue every year; but they could not say that the present increase was final. Everything was going on well; and they could hope for still better results next year.

Mr. JAMES CLOUDSLEY, J.P., having seconded the motion,

The CHAIRMAN remarked that he might remind the proprietors that going back ten years, they found the dividend on the "B" stock was 4⅛ per cent., and with each of the earlier years of this period it had gone up by ¼ per cent., and in latter times by ⅛ per cent. The dividend on these shares had been 4⅛ per cent., 4¾, 5¼, 5⅜, 5½, 5⅝, and was now 5¾ per cent. There was no reason why this progress should not go on. The Board could, in fact, promise it would go farther. They were in a position now to say that they would reduce the price of gas at the end of the year; and this would carry both to the proprietors and the employees the advantage of an increased return.

On the proposition of the CHAIRMAN, seconded by Mr. JOHN EVE, Mr. James Cloudsley was re-elected to his seat at the Board.

The CHAIRMAN moved the re-election of Mr. James Randall, and remarked that there was no face in the room which was more welcome than that of Mr. Randall. They were delighted to see that he maintained so much vigour both in mind and body.

Mr. EDWARD CROWNE seconded the motion, expressing the hope that Mr. Randall would have long life and strength to continue in the post he now held.

Mr. A. TAYLOR, as an old friend, heartily supported the motion; and it was carried with applause.

On the motion of Mr. OSBORN, seconded by Dr. SCOTT, the retiring Auditor (Mr. J. L. Chapman) was re-appointed.

INCREASES OF FEES AND SALARY.

Mr. HERBERT MICHELL remarked that last year when the proprietors met, and received from the Chairman such a satisfactory account of the transactions of the Company for the preceding half year, and on which occasion they had the pleasure of the attendance of so many who were now associated with the proprietors under the co-partnership system, he could not help thinking it would be a very proper and graceful thing on the part of the proprietors if they manifested their satisfaction with the great progress of the Company by making some recognition in a material form to those in the administrative offices. When they looked back eight years, they had evidence of the wonderful progress of the Company. In 1904, the number of consumers was 28,793; in 1912, the number had grown to 60,902—that was to say, it had more than doubled since 1904. The quantity of gas sold in 1904 was 906 million cubic feet, against 1723 million cubic feet now. The price of gas in 1904 was 2s. 10d.; the price during the past six months had been 2s. 2d. The price of the "A" stock in 1904 was 124; and the increased prosperity was reflected in the price to-day, when it stood at 146. The price of the "B" stock eight years ago was 100; now it was 117½. The dividend upon the "A" stock eight years ago was 6¼ per cent.; it was 7¼ per cent. now. The dividend on the "B" stock in 1904 was 4¾ per cent.; now it was 5¾ per cent. And perhaps as satisfactory as any evidence could possibly be as to their progress was the growth of the accumulated reserve, which was £36,260 in 1904, and now £90,910. There was the temptation of a highly successful Company for the Directors to say "as it is to-day, so shall it be to-morrow, and the next day also." But the most successful companies had vicissitudes; and it was most satisfactory to know that the Directors were recognizing this fact, and were making provision for the rainy day by the accumulation of good reserves. They had at the head of their affairs one of the ablest Chairmen of the day. Since he had been Governor of the Gaslight and Coke Company, that vast undertaking had risen to a state of prosperity which was not anticipated under the old regime; and, to a large extent, it was due to their able Chairman that the Tottenham and Edmonton Company occupied the position it did that day. They were thankful to see him in much better health than he was in six months ago; and they all hoped that his life would be spared by Providence for many years to preside over the Company. His colleagues, too, possessed the entire confidence of the proprietors; and some of their names were as household words in the district. He had the greatest possible pleasure in moving that the remuneration of the Directors be increased from £1800 to £2500 from July 1, 1912.

Mr. W. BROWN seconded the motion.

Mr. E. CROWNE, supporting the motion, said that some of those who were present at the meeting twelve months ago, would remember that he ventured to call attention to the fact that labourers were worthy of their hire; and he then suggested that those who were working in the direction of such a concern as this should share in the increased prosperity as well as those who were working in it manually. He was delighted to hear this resolution brought forward as a result of the seed he endeavoured to sow.

The resolution was heartily adopted.

The CHAIRMAN, in acknowledging the resolution on behalf of himself and his colleagues, said he thanked the proprietors for this substantial evidence of their satisfaction with the conduct of the undertaking, as well as for the extremely cordial manner in which it had been both proposed and passed. Far be it from him to magnify the office which he, in common with his colleagues, held; but it was right to say that the condition of things such as they enjoyed in partnership that day did not come like the rains from heaven, but involved diligent care and watchfulness on the Board's part. He had said more than once that service on the Board of the Company was a sincere and unqualified pleasure; and it had become a greater pleasure since they had had attending their meetings a considerable representation of those who until quite recently were not with them as proprietors. He referred to the workmen in the employ of the Company. It was a great gratification to the Board to see them present, and to know they were representing such a large body of men who shared in the prosperity of the

Company, and who were co-workers with the Board in securing this prosperity.

Mr. M. WILLIAMS proposed that the remuneration of the Auditors be increased from £130 to £200 per annum as from July 1, 1912.

Mr. SANDALL seconded the motion; and it was cordially endorsed.

Mr. CROWNE having responded for himself and Mr. Chapman,

Mr. HENRY BAILEY moved that the salary of the Secretary be increased by £100 per annum from Jan. 1 last. Mr. Topley had well deserved this. His work had been constantly enlarging with their growing prosperity. New arrangements were continually being made; and the good working of the machinery of the office largely depended upon him. The last phase of business that their Secretary had undertaken was the formation of an Approved Society under the National Insurance Act; and there was no doubt this had brought upon him additional hard work.

Mr. A. W. REID seconded the motion; and it was unanimously agreed to.

The SECRETARY acknowledged the resolution, and spoke of the pleasure that he derived from his work. With regard to the National Insurance Act, the work involved had been among the most pleasant that he had had to do; and he was perfectly certain, with regard to the Act, that it was good work. Those who had joined their Approved Society would appreciate it in time to come.

Proposed by Mr. TAYLOR, and seconded by Mr. R. RANDALL, a hearty vote of thanks was passed to the Chairman, Directors, the Engineer (Mr. A. E. Broadberry), the Secretary, staff, and workmen.

ALDERSHOT GAS, WATER, AND LIGHTING COMPANY.

The Half-Yearly Meeting of this Company was held on the 2nd inst.—Mr. W. T. ROBERTSON, J.P. (the Chairman), presiding.

The GENERAL MANAGER AND SECRETARY (Mr. R. W. Edwards) having read the notice convening the meeting, the report and accounts for the six months ended June 30, some particulars from which were given in the "JOURNAL" for the 23rd ult., were presented.

The CHAIRMAN, in moving the adoption of the report, said the period it covered had been one of some anxiety, owing to the coal miners' strike and to the general labour unrest. So far as the Company were concerned, special arrangements had been made to withstand the miners' stoppage for at least three months, by the installation of duplicate oil-gas plant, which had worked well. He was glad to say that the sales of gas were in advance of the corresponding half of last year by 6·4 per cent. This increase might be regarded as good, especially with such a mild winter as the past had been, which was not conducive to the extended use of gas for heating purposes. There was evidence before them that gas companies generally were pushing themselves to the fore, and displaying activity and co-operation throughout Great Britain, which would undoubtedly have a beneficial effect. The Company were supporting a movement for a great national gas exhibition to be held next year; and it was hoped that not only would this exhibition be able to pay all expenses, but that it would also add very materially to the educational movement initiated by the Gas Publicity Committee. Having referred to the adoption of co-partnership by the Company, the endeavour of the Alkali Manufacturers' Association to restrict gas companies' powers in regard to dealing in residual products, and the substitution of a calorific for an illuminating power standard for testing gas, the Chairman concluded by saying that the past half-year's results had been very gratifying, and he expressed the hope that the Company's business might continue to display a healthy expansion.

Mr. A. BROWN seconded the motion; and it was carried.

Thanks having been accorded to the Board and staff,

The CHAIRMAN, in reply, said the Directors owed much of the success attained to their General Manager and Secretary, and to the efficient working of the staff under him.

Mr. EDWARDS, in acknowledging the compliment, assured the proprietors that every one of their men was loyal to the backbone in regard to the interests of the Company; and therefore, on their behalf, he was the more gratified at being able to thank them for their vote and their confidence.

NEWPORT (MON.) GAS COMPANY.

Continued Satisfactory Progress.

The Ordinary Half-Yearly Meeting of this Company was held last Wednesday—Dr. H. M. BREWER, J.P. (the Chairman), presiding.

The SECRETARY (Mr. T. H. Hazell) having read the notice convening the meeting, the report and accounts for the six months ended the 30th of June were presented. The latter showed that the revenue in the half year was £41,704, and the expenditure £32,758; leaving £8946 to go to the profit and loss account. The sum available for distribution was £10,700; and the Directors recommended the payment of the statutory dividend and the interest on the debenture stock.

The DEPUTY-CHAIRMAN (Mr. T. G. Cartwright, J.P.), in moving, on behalf of the Chairman, who had lately recovered from a severe illness, the adoption of the report, mentioned that an issue of £8000 of consolidated stock, to meet the cost of the new works at Crindau, had been placed at prices slightly in excess of the fixed minimum of £110 per cent. This was very satisfactory; and another gratifying point was that a considerable amount was taken up by the employees of the Company. This was a thing they hoped to extend in any future issue they might make, because they felt that the more the employees were interested in the actual working of the Company, outside their wages, the better it would be for the concern. He personally was of opinion that co-partnership was the remedy that would put an end to the perpetual struggle between capital and labour. He hoped some of the foremost people in the different industries would put their heads together and try to bring it to a satisfactory issue. The half year had been an anxious one on account of the coal strike. Gas companies were among the principal people to feel trouble in the coal world; and the Company, in common with others, had felt the effects of the strike. There was one bright spot, however, and that was that, thanks to the good management and foresight of the Engineer, Mr. Canning, they were able to keep up a full supply of gas during the whole period of the strike, so that consumers were not inconvenienced for a single hour. This also applied to the public lighting of the town, so far as the Company supplied the gas-lamps. Another satisfactory thing was that they were able to supply coke to the poor people in Newport at a reduced price during the time that coal was scarce and dear. At the February half-yearly meeting, he remarked that he did not think they would ever see the price of coal much lower. He still held this opinion. The Directors had just made contracts for the next twelve months at increased prices of, roughly, 1s. per ton. When they considered what the Company's consumption of coal was, this was a very big item. The sale of gas for the half year had shown an increase of about 5 per cent., which he thought, under all the circumstances, might be considered satisfactory. Then, again, residuals had produced more money, and the whole result of the half-year's working was that they were able to pay the interest on their debentures and on their consolidated stock at the rate of 5 per cent. per annum, and to carry forward a slightly reduced amount. In conclusion, Mr. Cartwright observed that they had very nearly completed the works at Crindau; and he hoped that when they were in full operation they would be successful, and of benefit to shareholders and to gas consumers.

Mr. G. GEEN seconded the motion, and it was carried.

The dividend was then declared; and the retiring Directors and Auditor were re-elected.

Sir GARROD THOMAS proposed a vote of thanks to the Chairman, Directors, and officials of the Company.

Alderman LLOYD seconded the motion, and it was agreed to.

The CHAIRMAN, in responding, said the Directors went into their work regularly. As to their staff, in Mr. Canning, Mr. Hazell, and the others they were most fortunate, for they had experience and ability, and thought of everything. It was entirely due to their foresight that the Company were able to keep up a full supply of gas during the coal strike.

Mr. HAZELL and Alderman CANNING also acknowledged the vote, and the proceedings closed.

CAMBRIDGE GAS COMPANY.

Successful Half Year—Extension of Area of Supply.

The Half-Yearly Meeting of the Cambridge Gas Company was held last Tuesday—Mr. W. B. REDFERN (the Vice-Chairman) presiding.

The report presented by the Directors set forth that the Board of Trade had granted a Provisional Order sanctioning the inclusion of the parishes of Great and Little Shelford, Stapleford, Impington, and Fulbourn in the Company's area of supply. The accounts accompanying the report showed that the revenue in the six months ended the 30th of June amounted to £42,262, compared with £40,163; that the expenditure was £35,216, against £33,495; and that the balance carried to the profit and loss account was £7046, against £6668. The amount available for distribution was £23,507; and the Directors recommended a dividend at the maximum rates, less income-tax.

The CHAIRMAN, in moving the adoption of the report, expressed regret at the absence of the Chairman of the Company (Mr. E. H. Parker). The Directors had to congratulate the shareholders on a successful half year, and on the increased profit made. Notwithstanding the reduction in the price of gas made at this time last year, the increase had amounted to a little over £1600 per annum. During the six months they had added to the number of their customers 52 ordinary meters and 206 slot meters—in all an addition of 258 new consumers. The consumers by ordinary meters now amounted to 6879, and by slot meters 5245; making 12,124 customers. They had connected an additional 251 cookers; 135 being supplied to consumers burning gas through ordinary meters, and the remainder to those supplied through slot meters. They had now no fewer than 6445 gas-cookers in use in Cambridge. During the six months there had been an increase in the gas made of more than 6 million cubic feet. This would have been greater but for the economy exercised in the use of gas during the coal strike. The strike did not seriously affect the working of the Company, owing to the foresight of the Directors, who took the precaution to lay in a large additional stock of coal. The result of the strike, however, was that next year's contracts would have to be made at a considerably increased price; from 2s. to 2s. 6d. per ton additional was being asked. This meant that the coal bill next year would be increased by at least £4000. As 1d. on the price of gas realized something like £1600, it would be seen that to meet this increase, the price of gas would probably have to be raised 2½d. per 1000 cubic feet. The Directors hoped all their employees would show zeal and interest in the Company's welfare, and so prevent the price of gas from having to be increased; for if this were done, the co-partners would lose ¾ per cent. bonus on their wages for every 1d. the price was raised. They had now 177 co-partners, and in three years they had had placed to their credit £2372. Of these co-partners, 156 were shareholders in the Company. As would be seen from the report, the Board of Trade had made an Order authorizing the Company to considerably extend their mains.

The report was adopted, and the dividend recommended was declared.

The retiring Directors and Auditor having been re-elected,

The CHAIRMAN said the staff at the works and in the office were most efficient in all their work, and the thanks of the Directors were due to them, and especially to Mr. Auchterlonie, the Engineer and Manager, who continued to be their adviser and most efficient official.

Thanks were accorded to the staff and to the Board of Directors.

It was stated at a meeting of the Oldham Water Committee last Thursday that damage estimated at between £2000 and £3000 had been caused to the Castleshaw and Denshaw water-works by the heavy storm which swept over the district on the 31st ult.

CROYDON GAS COMPANY.

Half-Yearly Report and Accounts.

In the report to be presented at the meeting of the Croydon Gas Company on Friday next, the Directors state that the sales of gas in the six months ended June 30 exceeded those of the corresponding period of 1911 by 7·34 per cent. The number of consumers increased in the half year by 994, and that of stoves on hire by 1913; while 268 stoves were sold to consumers, representing a total increase in gas-stoves of 2181. The price of gas in the Caterham area has, in compliance with the provisions of the Company's Act of 1905, been reduced by 2d. per 1000 cubic feet—*i.e.*, to 2s. 9d.—as from the 1st of July last, compared with 3s. 9d. at the time of the transfer to the Company. Notwithstanding the difficulties experienced in obtaining supplies of raw material owing to the coal strike and the transport workers' strike, a full and uninterrupted supply of gas was maintained. Arrangements were also made whereby a supply of coke at a low price for household fuel was available in case of need for the poorer residents in the district. To meet the situation created by the passing into law of the National Insurance Act, 1911, the workmen's sick and burial fund, which has been in existence for over 26 years, is being continued in an altered form as a voluntary fund, assisted by the Company, providing medical and other benefits supplemental to those of the Act, and in addition bridging over the waiting period of six months. Practically the whole of the Company's permanent workmen have elected to join the fund.

The accounts accompanying the report show that the total revenue was £128,827, of which £89,148 was derived from sales of gas, £10,752 from rental of meters, stoves, and house fittings, and £28,780 from sales of residuals. A sum of £57,255 was expended on manufacture. and £20,272 on distribution; rent, rates, and taxes came to £5131; management cost £4696; and the total expenses (inclusive of £1395 for the co-partnership scheme) were £94,039. The balance carried to the profit and loss account is £34,788; and the amount available for distribution is £45,309. The Board recommend the payment of dividends at the rates of 15, 12, 10, and 5 per cent. per annum, all less income-tax, on the various classes of stock. This will absorb £23,524, and leave a balance of £21,785.

The statements relating to the working show that 40,211 tons of coal and 549,444 gallons of oil were used during the half year to manufacture 756,740,000 cubic feet of gas, of which 721,816,600 feet were sold and 731,080,700 feet were accounted for. The estimated quantities of residuals produced were: Coke, 24,126 tons; breeze 5374 tons; tar, 465,768 gallons; ammoniacal liquor, 1,167,329 gallons—the make of sulphate being 434 tons.

SALFORD CORPORATION AND THE RESIDUALS CLAUSE.

Agreement with the Alkali Manufacturers' Association.

At the Meeting of the Salford Town Council last Wednesday, the proceedings of the Parliamentary and Public Trusts Committee, which were confirmed without comment, showed that, in connection with the Provisional Order Confirmation Bill containing the Salford Gas Order just passed, the following undertaking had been given to the Alkali Manufacturers' Association.

The Corporation will not purchase or use, in any process of manufacture, any materials other than those required for the making and supply of gas by them, or for the working-up of their own residual products, or for the construction, maintenance, and repair of their gas-works plant and buildings, or for the maintenance or repair of gas-fittings, pending the report of any tribunal which may be appointed to consider whether this or a similar restriction should be imposed generally on gas undertakings. If such tribunal be not appointed in the course of the present session of Parliament, the Corporation will remain bound by the foregoing restriction unless and until a tribunal has been appointed and shall have reported. If such tribunal shall report in favour of the powers of gas undertakings being restricted as aforesaid, then the Corporation will apply in the session in which such report is made, or in the immediately ensuing session, to the Local Government Board for a Provisional Order to amend, in accordance with the recommendation of such tribunal, the Acts and Orders under which they operate. The Alkali Manufacturers' Association agree that the Order now being promoted by the Corporation shall proceed without the inclusion of the clause as to purchase of materials submitted by them.

THE ILKESTON GASHOLDER ACCIDENT.

The Compensation Money.

It was mentioned in the last number of the "JOURNAL" that the Gas Committee of the Ilkeston Corporation had agreed to accept £2000 from the Royal Insurance Company as compensation on account of the gasholder accident early in the year. Referring to the matter, our local correspondent says: Results have not justified the anticipations which, soon after the occurrence, were confidently expressed in official circles, as to the Ilkeston Corporation being secure against any pecuniary loss through the explosion which took place at the gas-works, resulting in the demolition of a spiral-guided gasholder and tank. The matter, as will be remembered, formed the subject of exhaustive official inquiry, undertaken at the direction of the Home Secretary, under the provisions of the Factory and Workshop Act, 1890, and at the earlier of the sittings the Royal Insurance Company were specially represented. The Corporation held a policy effected with the Company, under which, it was understood, not only the value of the holder and tank was covered, but also of the gas which was lost. It now transpires, however, that, consequent upon a legal difficulty as to the exact interpretation to be placed upon the terms of the policy, a compromise has been effected with the Company, under which the Corporation will receive a much smaller sum than was originally anticipated—leaving a considerable margin to be made up between the cost of the holder as constructed and the amount which the Insurance Company have agreed to pay. The matter came up at a meeting of the Council on the 30th ult., when Mr. Macdonald called attention to the fact that a settlement had been arrived at upon the basis of the Company consenting to pay £2000 to meet all demands. He agreed that this might be regarded as an inadequate amount; but he added that there were certain elements in the case which had induced the Gas Committee to agree to the acceptance of the amount named. It is understood that the point involved presented the possibility of some complex legal considerations, and that in the event of the matter leading to litigation a costly process might have been involved. The policy covered the works against loss by fire. The question arose, however, whether what occurred when the explosion took place could be construed as being strictly in the nature of a fire; and, in the exercise of their discretion, under these somewhat difficult circumstances, the Corporation have made the best of the situation by compromising with the Company.

GAS-COOKERS AND PRICES AT HALIFAX.

At a Meeting of the Halifax Town Council last Wednesday, the Gas Committee recommended: (1) That the existing rents for gas-cookers be reduced by 50 per cent.; (2) that where gas-cookers, gas-fires, and other approved gas appliances were purchased from the Corporation no charge be made for fixing the same, except where the piping exceeded 30 feet; (3) that a rebate of 5s. be made to persons who purchased from the Corporation gas-cookers, &c., and desired to have the same fixed by their own plumbers; and (4) that a discount of 15 per cent. from the list price be allowed to authorized plumbers who purchased gas-cookers, &c., gas-fittings, and gas-burners from the Corporation. Mr. Spencer moved that the recommendations be referred back, on the ground that they were inconsistent. Twenty-three voted for the amendment and a similar number against, and so the amendment fell to the ground. An amendment that recommendations Nos. 3 and 4 be referred back having been accepted, Alderman Thomson moved, and Mr. Spencer seconded, that Nos. 1 and 2 be referred back; but this was defeated.

The Gas Committee next recommended the adoption, as from July 1 last, of a reduced scale of gas charges, as follows: Gas consumed for heating purposes in excess of 6 million cubic feet, 1s. 1d. per 1000 cubic feet; gas consumed for gas-engine purposes in excess of 6 million feet, 1s. 4d. per 1000 feet; gas consumed for both heating and gas-engines in excess of 6 million feet, 1s. 4d. per 1000 feet for the second 6 million feet, and 1s. 1d. per 1000 feet for all over that. The above charges were all subject to an allowance of a penny per 1000 cubic feet if accounts were paid in the prescribed period. Alderman Thomson moved that the proposals be referred back. He remarked that there would be no reduction in the price until a consumer had expended between £500 or £600 per annum on gas. If relief were to be given at all, they should begin very much lower down the scale than 6 million cubic feet. Such a consumption meant a gas-engine of about 250 H.P., and there were very few of them in Halifax. Moreover, if gas could be sold at 1s. 1d. for heating, why should they charge 1s. 4d. for gas-engines? Mr. Spencer said that, according to the abstract of accounts, the total cost of gas per 1000 cubic feet sold was 1s. 6·61d., and here was a proposal to sell it at 1s. 1d., less 1d. discount. He could not understand why the Gas Committee should propose to let the big consumer have gas at 1s. per 1000 cubic feet, when they charged the public lighting department, which took 10 per cent. of the output, the sum of 1s. 6d. Mr. Taylor urged that the Council could not make reductions to the large consumers except at the expense of the bulk of their customers. A municipality ought not to enter a commercial race in which they had to penalize one section of the community for the benefit of another. Mr. Smithson, on the other hand, declared that the proposition was thoroughly sound and businesslike, and if adopted the Committee would get a very large extra consumption, which would bring a net profit to the Corporation of £533. With the consent of the Gas Committee, the recommendations were referred back—a report on the matter to be presented to the Council and discussed by them in committee.

PROPOSED EXTENSION OF FALKIRK.

Opposition to a Provisional Order.

The Parliamentary Commissioners have lately been occupied in Edinburgh in hearing evidence in regard to the Falkirk burgh extension proposal. The origin of this proposed Provisional Order is somewhat peculiar. A Mr. George Balfour, who is the Chairman of the Scottish Central Electric Power Company, applied for powers to supply electric current for lighting purposes in Larbert, Stenhousemuir, and Canonside. The Power Company already have the right to supply power in these places, and, by what is known as the "sewing-machine clause," they can supply light to any consumer to whom they also supply power. The Falkirk burgh authorities supply gas in these districts; and they asked Mr. Balfour Browne, K.C., for his advice as to the best way to combat Mr. Balfour. The learned Counsel advised them to apply for an extension of the burgh boundaries to cover the whole of the places. It should be mentioned that they applied last year for such an extension; but the Parliamentary Commissioners then refused the Order without hearing the objectors. The extension now applied for is slightly different from the former one; but the general outline of the proposed burgh is that of the letter C reversed Ɔ. The burgh authorities, among other witnesses, put their Gas Manager (Mr. W. Wilson) in the box; but Mr. Balfour Browne's examination

of him was very brief. After an equally brief cross-examination by Mr. Talbot, K.C., representing the County Council of Stirlingshire—the principal objectors to the Order—Counsel remarked: "I am very pleased to meet you, Mr. Wilson, but I don't know why you are here." Mr. Alex. Wilson, of Glasgow, was also present on the same side, but was not called.

Upon the side of the County Council, so far as gas matters are concerned, are Mr. W. R. Herring and Mr. Henry O'Connor. Mr. Herring stated that, with Mr. O'Connor, he had been round both the burgh and the districts proposed to be annexed, and they considered the streets in the latter were quite as well lighted as those in the burgh. He thought the gas undertaking would not feel the opposition of electricity, as he had seen an extract from the valuation roll of the districts, and the average rent of the houses was under £15 per annum, and these houses were not likely to require electric light. The general result of electric lighting was an extension also of the gas supply. Mr. O'Connor was held as concurring in Mr. Herring's evidence; and, to save time, he was not called.

STOCKPORT PUBLIC LIGHTING.

Gas Preferred to Electricity.

Some time ago, at the request of the General Purposes Committee of the Stockport Corporation, made through the Public Lighting Sub-Committee and the Gas Committee, Mr. S. Meunier, the Gas Engineer and Manager, prepared a scheme for the lighting by gas of one of the leading thoroughfares in the borough (Wellington Road South), together with an estimate of the cost and the annual charge for maintenance. A copy of the scheme and the estimates were subsequently furnished to the General Purposes Committee. The Corporation Electricity Engineer supplied a similar report on the lighting of the road by electricity. After discussion, the General Purposes Committee decided upon gas, but with the following condition: "The Gas Committee to be informed that this Committee [the General Purposes] cannot authorize the scheme to be proceeded with until the price which the Committee will charge per 1000 cubic feet of gas for all public lighting is settled." The proceedings of the General Purposes Committee were confirmed without discussion at last Wednesday's meeting of the Town Council. It was elicited, however, that a meeting of the Public Lighting Sub-Committee would shortly be held for the purpose of considering the question of the charges for street lighting.

NEW WATER-WORKS AT EXMOUTH.

An Ample Supply Provided.

The formal inauguration of the new water-works for Exmouth took place last Tuesday, when the water was turned on by Lady Clinton. Dotton, the source of the supply, is situated about eight miles from the town and five miles from the reservoir at Squabmoor, from which the supply is mainly derived. At the new works, a borehole has been sunk to a depth of 338 feet; and this has been lined with steel tubes, the diameter of which tapers from 0·25 to 7 inches. The pumping plant is in duplicate, and consists of air compressors each of which is capable of raising 18,000 gallons of water per minute, and a set of three-throw rams which force it through a 9-inch main to the reservoir at Squabmoor. Gas-engines of 60 B.H.P. furnish the motive power. Messrs. G. H. Hill and Sons, of Westminster and Manchester, were Engineers of the scheme, which was carried out under the direct supervision of Mr. S. Hutton, the Surveyor and Water Engineer to the Urban District Council; Mr. A. C. Potter being the Contractor.

Mr. J. E. Montgomery, on behalf of the Engineers, presented Lady Clinton with a silver-gilt key, with which she unlocked the door of the engine-house; and Mr. Potter presented a silver valve-wheel, with which the engines were started. Mr. H. Blackmore, the Chairman of the District Council, in thanking her ladyship, said they had spent between £14,000 and £15,000 on the works, and now had not only sufficient water for the town, but such abundance that they could supply the needs of their neighbours. Lady Clinton made a brief speech in reply; and Lord Clinton added his congratulations to the town on the completion of the works, which he believed were excellent in design and had been admirably carried out.

At a luncheon held in celebration of the event, Lord Clinton remarked that the water problem was every day becoming a more serious one for the big centres. As the demand increased, owing to the growth of the population and the need of a larger supply per head, cities and towns had to go farther and farther afield, and to pay practically any price that was asked for water. He knew from experience in Parliamentary Committees that it was a very difficult matter to grant the water urgently needed by the great towns without doing serious damage to the localities from which the water was drawn. Before long, some public authority would have to be appointed charged with the duty of scientifically conserving all the possible water supplies of the country, and distributing them fairly among those most in need of them. Fortunately, Exmouth was not experiencing a difficulty of this kind, and the town had in the new supply one which he thought would be ample for a very long time to come.

Incandescent Gas for School Lighting.—The Education Committee of the Hornsey Town Council have considered the question of the lighting of the temporary school at Muswell Hill, and have recommended the use of incandescent gas. At the last meeting of the Council this was approved.

Natural Gas in Hungary.—According to a special telegram to the "Financial News," an English syndicate are negotiating with the Hungarian Minister of Finance for a concession to work the important natural gas deposits at Kissaromar. This is probably the source of natural gas to which reference is made in a review appearing elsewhere to-day.

NOTES FROM SCOTLAND.

From Our Own Correspondents.

Saturday.

Auchtermuchty.—At the annual meeting of the Auchtermuchty Gas Company, it was agreed to reduce the price of gas 5d. per 1000 cubic feet.

Buckie.—The Buckie Gas Company have made application to the Town Council for permission to open the streets in order to allow the extension of gas to Portessie.

Carnoustie.—At a meeting of the Town Council held on Monday, the Gas Department estimates for the current year were submitted. The revenue was stated at £5663; the sale of gas producing £4572, residual products £1081, and other revenue £10.

Doune.—The Doune Lighting Committee have given notice that, owing to the advance in the cost of coals, the price of gas will be raised from 5s. 10d. to 6s. 3d. per 1000 cubic feet.

Dundee.—An installation of the Textile compressed gas system of lighting has just been completed at the Logie Works, Dundee, by the Textile Illuminating and Engineering Company, of Manchester. A large number of local manufacturers and others availed themselves of the opportunity to inspect the system on Friday night, and all were highly satisfied with the light. It is claimed for the system that each burner uses only 2 cubic feet of gas per hour, and gives a light of 100-candle power.

Helensburgh.—At the monthly meeting of the Helensburgh Town Council—Provost Kidston presiding—Hon. Treasurer Bonar submitted his statement as to the finances of the burgh for the past year. The Gas Department showed a total income of £14,106, and a total expenditure of £10,891. The net balance on the year's working was £819. The total liabilities of the department amounted to £39,482, and the assets to £54,833; leaving surplus assets of £15,351.

Inverurie.—The Inverurie Gaslight Company have resolved to reduce the price of gas for lighting by 5d. per 1000 cubic feet—from 6s. 3d. to 5s. 10d. There is to be no change in the cost of gas for heating and cooking; the present price being 4s. 7d. per 1000 feet.

Perth.—The accounts for the past financial year, and the estimates of income and expenditure for the current year, were submitted at a meeting of the Gas Committee of the Town Council held on Monday. The revenue account shows that the total income of the undertaking, omitting shillings and pence, was £40,938 (which includes £31,249 from the sale of gas and £9637 from residual products), while the expenditure totalled £28,649; leaving a balance of £12,289 to be carried to the net revenue account. Coal (£12,411) and wages for carbonizing (£2506) accounted for £14,917 of the expenditure; maintenance of works and manufacturing plant costing £1435. Distribution (wages of meter inspectors, repairs of meters, and maintenance of main and service pipes) cost £2136; while rents, taxes, rates, and insurance amounted to £3783. A sum of £1197 was spent on the gas-stove department, and £1997 on general administration. There was an income of £13,661 in the net revenue account. Of this, the largest part, amounting to £8819, was expended on repayment of loans and interest; £850 is to be carried to the reserve fund; gas annuities account for £2812; while the sum of £250 is handed over to the Common Good. The balance at the credit of the sinking fund at the end of the year amounted to £6827, and at the credit of the reserve fund account to £7010. The total liabilities of the undertaking amount to £202,408; and the surplus assets are stated at £71,944.

Stranraer.—Owing to the increased cost of coal, the Stranraer Gaslight Company have intimated that the price of gas will be increased 2d. per 1000 cubic feet.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Aug.* 10.

Sulphate of Ammonia.

Since the holidays the market has assumed a quieter tone, and values have again been inclined to give way slightly. Dealers are apparently in no hurry to cover their August requirements, and consumers seem to be waiting developments before making extensive purchases. There has, however, been no pressure on the part of manufacturers to effect sales, and the closing quotations are £14 3s. 9d. per ton f.o.b. Hull, £14 5s. per ton f.o.b. Liverpool, and £14 6s. 3d. per ton f.o.b. Leith. In the forward position, the views of producers and buyers have continued too divergent to admit of business, but it is reported that there are still second-hand sellers at considerably less money than makers are willing to accept.

Nitrate of Soda.

The market for this material is firmer, and the spot quotations have been advanced to 11s. 1½d per cwt. for ordinary and to 11s. 3d. for refined quality.

LONDON, *Aug.* 12.

Tar Products.

Tar products have been steady throughout the past week, but with not very much business doing. Sellers consider that tar is so short that by waiting they will obtain their price. On the other hand, buyers think prices too high to hold, and, at any rate, that by waiting they will do no harm, and may do very much better. Pitch is steady; but apparently only South Wales are buying for near delivery, and even for this are not quite so eager as a week or two ago. Benzols and solvent naphthas maintain their prices very well and in some instances are talked higher. In regard to carbolic, actual consumers will not pay anything like the prices asked; but dealers appear to be short, and bid readily for anything which comes on the market for near delivery. Crystals are nominally a high price; but second-hand parcels are offered at much below makers' ideas. Creosote is very firm indeed, and prices are hardening.

The average values during the week were: Tar, 29s. to 33s. *ex* works. Pitch, London, 51s. 6d. to 52s.; east coast, 51s. 6d. to 52s.; west coast, Clyde 52s. to 54s., Manchester 50s. 6d. to 51s. 6d., Liverpool 51s. to 51s. 6d. Benzol, 90 per cent., naked, London, 1s. 1d.;

North, 1s.; 50-90 per cent., naked, London, 10½d. to 11½d.; North, 10½d. to 11½d. Toluol, naked, London, 11d. to 11½d.; North, 11d. to 11½d. Crude naphtha, in bulk, London, 5½d. to 5¾d.; North, 5d. to 5½d. Solvent naphtha, naked, London, 1s. 1½d. to 1s. 2d. f.o.b.; North, 1s. to 1s. 1d. f.o.b. Heavy naphtha, naked, London, 11d. to 1s. f.o.b.; North, 10d. to 11d. f.o.b. Creosote, in bulk, London, 3⅜d. to 3¼d.; North, 2⅞d. to 3d. Heavy oils, in bulk, 3¼d. to 3⅜d. Carbolic acid, casks included, 60 per cent., east coast, 2s. 7½d. to 2s. 8½d.; west coast, 2s. 6½d. to 2s. 7½d. Naphthalene, £4 10s. to £8 10s.; salts, 45s. to 50s., bags included. Anthracene, "A" quality, 1¼d. to 1⅜d. per unit, packages included and delivered; "B" quality, unsaleable.

Sulphate of Ammonia.

The market has been steady throughout the past week and prices well maintained, with a tendency to improve. A fair amount of business is believed to have been done in the States which has still to be covered on this side; and this makes sellers firm. The Gas Companies are asking £14, with outside London makes £13 7s. 6d. to £13 10s. In Hull, the price is £14 3s. 9d. to £14 5s.; Liverpool, £14 5s. to £14 7s. 6d.; and Leith the same.

COAL TRADE REPORTS.

Northern Coal Trade.

There is a stronger inquiry for both steam and gas coal, and there are now heavier shipments both coastwise and foreign. In steam coals, the demand is full; and for best Northumbrians, from 14s. 9d. to 15s. per ton f.o.b. is quoted. Second-class steams are 13s. to 13s. 6d. per ton; and steam smalls are firm at 9s. 6d. to 10s. 6d. Work at the collieries is now tolerably full; and there is a normal output. In the gas coal trade, the demand is heavier; and the tendency is towards fuller deliveries, and for some kinds to higher prices. Best Durham gas coals are from 13s. 6d. per ton f.o.b.; second-class are about 12s. 3d. to 12s. 6d.; and "Wear specials," about 14s. Now that the great contracts are settled, the collieries have less coal to dispose of, and seem inclined to ask higher prices. There are some sales of gas coal for export; and the larger demand that is now known for Durham coals generally tends to stiffen the prices of good gas coal. As more furnaces are put into blast, this larger demand will probably grow. Coke is very firm. The fuller output of gas coke is well taken up—good makes being now from 18s. to 18s. 6d. per ton f.o.b.

Scotch Coal Trade.

During the past week, the demand for all classes of Scotch coal has continued unabated, and difficulty is being experienced by some collieries in satisfying the insistent calls made upon them. Prices rule at a high level. On Thursday, the f.o.b. prices quoted in Glasgow were: Steam coal, 11s. 6d. to 12s. per ton; splint, 12s. 6d. to 13s.; ell, 11s. 6d. to 12s.; trebles, 13s. to 13s. 6d.; doubles, 12s. 6d. to 13s.; and singles, 11s. 6d. to 12s.

Bournemouth Gas and Water Company.—At the meeting of this Company next Friday, the Directors will report that the sales of gas in the six months ended the 30th of June showed a substantial increase over those in the corresponding period of last year—due, no doubt, in some measure, to the fact that during the coal strike the public took advantage of the full supply of gas afforded by the Company, and used it in place of other fuel for heating and cooking purposes. The new vertical retorts at the Poole works have recently been brought into operation and are doing well. Under the provisions of the Company's Act of 1902, a further reduction of 2d. per 1000 cubic feet will be made in the price of gas in the Poole district from Michaelmas next.

Price of Gas at Stafford.—The Stafford Town Council have adopted a report in which the Gas and Electricity Committee recommended that the scale of charges for gas for power and heating for trade purposes only be amended as follows: For any quantity exceeding 200,000 cubic feet, but not exceeding 1,000,000 cubic feet, per quarter, 2s. per 1000 cubic feet (subject to 25 per cent. discount); 1,000,000 cubic feet, but not exceeding 2,000,000 cubic feet, per quarter, 1s. 5d. per 1000 cubic feet (without discount); 2,000,000 cubic feet per quarter, 1s. 4d. per 1000 cubic feet (without discount). The Committee further recommended that the reduction by 2d. per 1000 cubic feet in the price of gas for lighting and heating, as approved by the Council last June, be extended so as to apply to consumers outside the borough.

Gas Explosion at a Manchester Railway Station.—Seven men employed by the London and North-Western Railway Company at Exchange Station were injured by a gas explosion which occurred there on Saturday night, while a train for Bolton was being cleaned and its cylinders re-charged with gas. All the injured men were taken to the Salford Royal Hospital, suffering chiefly from burns and shock; while one had been badly cut by broken glass. After treatment, they were able, with one exception, to proceed to their respective homes. From the statements made by some of the sufferers, it seems that as the "gas man" was engaged pumping gas into the cylinders the pipe suddenly blew off, allowing the escape of a large quantity of gas. At the moment a youth happened to be passing with a lamp, and it is assumed that the gas was ignited by the light.

Increased Water Storage for Northampton.—At a recent meeting of the Northampton Town Council, the preparation of the scheme for a new reservoir at Hollowell was discussed. The Council have already passed the scheme and secured the necessary land. The proposal has now to go before Parliament; and in connection with it the Water Committee recommended that Mr. Frank Tomlinson, the Corporation Water Engineer and Manager, be appointed the Engineer to carry it through, and that Messrs. E. M. Eaton and J. W. Restler, MM.Inst. C.E., be retained to support it before Parliament. The Council were also recommended to authorize the Finance Committee to retain Counsel in connection with the Bill, and to pay Mr. Tomlinson an annuity to superintend and carry out the scheme. After a long discussion, the Council accepted the report of the Committee without any alteration.

Darlington Gas Undertaking.

It was mentioned in the "JOURNAL" last week that there had been an advance in all departments of the gas undertaking of the Darlington Corporation in the year ended the 31st of March last. This is borne out by the accounts and statistics prepared by the Borough Accountant (Mr. J. W. Armitage). The gross profit was £15,101, compared with £13,180 in the year 1910-11; the net profit being £8412, against £6305, equivalent to a rate of 8·41d. in the pound, and 4·5 per cent. on the capital invested. A sum of £5750 has been transferred in aid of the general district rate, compared with £5500 before. The capital invested in the undertaking is £186,507, or at the rate of 9s. 9d. per 1000 cubic feet of gas sold, against 10s. 8d. before. A balance of £8500 is carried forward, against £5838. Under the supervision of Mr. Frank P. Tarratt, the Gas Engineer and Manager, 39,453 tons of coal were carbonized, and 411,962,000 cubic feet of gas made, of which 379,445,000 cubic feet were sold; the gas unaccounted for being 6·45 per cent. There are altogether 14,183 consumers—7150 being of the ordinary and 7033 of the prepayment class. The figures for the preceding year were: Gas made, 400,257,000 cubic feet; sold, 349,992,000 cubic feet; unaccounted for, 10·96 per cent.; number of consumers, 13,527, of whom 7109 were of the ordinary and 6418 of the prepayment class.

Salford's Unprofitable Electricity Undertaking.

At last Wednesday's meeting of the Salford Town Council, considerable discussion took place upon a proposal from the Electricity Committee which was said would mean eventually an expenditure of from £250,000 to £500,000 in the establishment of new works and plant. After Alderman Jenkins had advised the Committee to take the matter back for further consideration, Mr. Bratherton said that to his mind there was a lack of business ability in relation to the scheme. Here they had an undertaking which was a money-losing concern—no profit having been made this year; and it was not business or fair to the ratepayers that their money should be dealt with in this way. Alderman Phillips emphasized the need for caution and the fullest discussion on so large a project. As Chairman of the Gas Committee, he said he did not care to interfere with the proceedings of the Electricity Committee; but if half-a-million of money, or more, was going to be spent, it should only be sanctioned after the fullest consideration. The electricity undertaking was carried on at present under circumstances which would not satisfy him. Current was being sold for less than it cost to generate, and the Committee argued that this suited them better than to have the works idle. This might be all very well as things were, but if they were going to build new works for the generation and sale of power in the same way, it was a different matter. The Town Clerk having announced that the Council would not be committed to anything by passing the minutes, they were agreed to.

Bolton Gas Workers' Wages.

A long discussion took place at last Wednesday's meeting of the Bolton Town Council with regard to the gas workers' wages and conditions of labour. At a meeting of the Gas Committee held prior to the Council meeting, the application made by the men for an advance in wages and altered conditions for certain grades of workmen was again under consideration. The Gas Engineer (Mr. W. J. Smith) reported as to several interviews he had had with the men's Secretary; and the Chairman (Alderman Webster) gave details of the arrangements made with the leaders. The Committee approved of the amended conditions. At the Council meeting, Alderman Webster, in moving the confirmation of the proceedings of the Committee, said the arrangements made were very satisfactory. Several members of the Council wanted to know what the "arrangements" were; and it was on this point that discussion ensued. Alderman Webster preferred not to give particulars. But it was stated by a member of the Gas Committee that the advance in wages to the men was one of ¼d. per hour all round; and this, with certain alterations in working conditions, would mean an increase in the wages bill of the department by a little more than £600 a year. Several amendments were proposed and defeated. Finally it was decided, by 24 votes to 22, that the whole matter should be referred back to the Committee with a view to the insertion in the agreement of a clause to the effect that the amended terms now arranged should hold good for a definite term—that is, three, four, or five years.

Winsford Gas-Works Extensions.—An inquiry has been held at Winsford, Cheshire, by Mr. A. B. Brightmore, M.Inst.C.E., on behalf of the Local Government Board, relative to an application by the Urban District Council for sanction to borrow £3500 for the purposes of the gas undertaking. Mr. F. Sidwell, the Gas Engineer and Manager, stated that the money was required for a new gasholder and steel tank, and it was proposed to convert the old tank into a tar and liquor tank. There was no opposition to the application; and the Inspector complimented the Engineer and the Council on the very satisfactory way in which the works were carried on.

Burton-upon-Trent Corporation and the Acquisition of Gas Undertakings.—The Gas Committee of the Burton-upon-Trent Corporation report that they have received a letter from Messrs. J. C. Staton and Co., Limited, of Tutbury, confirming their verbal offer made to the Chairman of the Committee to sell to the Corporation the Tutbury gas undertaking, including the plant, mains, services, meters, and goodwill, but excluding land, buildings, book debts, and cash in hand, for the sum of £3000; the gas-cookers and stocks to be taken over at a valuation. The Committee passed a resolution accepting the offer subject to the approval of the Council and the sanction of the Local Government Board. The Committee have also received a joint report from Mr. J. Ferguson Bell, the Consulting Engineer to the Corporation, and Mr. R. S. Ramsden, the Assistant-Manager, on the proposed purchase of the Rolleston and Tutbury gas undertakings, and the extension of the gas-mains to supply the two places named and part of Hatton direct from the Burton works. The report and the estimate of the total cost of the scheme—viz., £11,500—were approved.

Tipton Gas Undertaking.—The Tipton Urban District Council have received the sanction of the Local Government Board to loans totalling more than £10,000, which money is to be spent on extensions in connection with the gas undertaking—including an installation of vertical retorts. It is stated that the profit on the gas-works for the past financial year was over £260 more than for the previous year; and of the surplus, £600 has been allocated to the relief of the rates. The net balance of profit was £1699.

Biddulph Gas Purchase Question.—At the monthly meeting of the Biddulph Urban District Council, there was a long discussion on a motion by Mr. Cole, "That the Council abandon any scheme either for the purchase of the Biddulph Gas-Works or for buying electricity in bulk." In the result, however, an amendment was carried, by eight votes to five, "That the Council continue the negotiations with the Gas Company, and ask Mr. J. H. Brearley to form one of a deputation to meet the Gas Directors." Mr. Brearley had been called in to advise the Council; and he submitted a report in favour of the acquisition of the works. A deputation was subsequently appointed.

Bridport Gas Company, Limited.—The accounts of this Company for the year ended June 30 show a record of continued progress. During the twelve months a new sulphate of ammonia plant was erected, and the retort-house roof renewed. There were 2785 tons of coal carbonized; the products sold being as follows: Gas, 27,863,000 cubic feet (increase of 1,300,000 cubic feet); coke, 1361 tons; tar, 34,470 gallons; sulphate of ammonia, 25 tons 16 cwt. After depreciating gasholders by 3 per cent., the revenue account shows a profit of £1548, out of which dividends of 8 per cent. on the ordinary and 5 per cent. on the preference shares are to be paid, and a sum of £112 is to be placed to reserve; a balance of £801 being carried forward, against £686 last year. A further increase of salary was voted to the Engineer and Manager (Mr. W. H. Reed), in addition to a bonus on the year's working; and the price of gas was reduced to 3s. 6d. per 1000 cubic feet for lighting, and 3s. for power purposes, with discounts.

Public Lighting of Acton and Feltham.—At the last meeting of the Highways Committee of the Acton Urban District Council, it was decided to accept the offer of the Brentford Gas Company to supply high-pressure gas for the main streets at £517 per annum, under a five years' contract. The Works Committee of the Feltham Urban District Council have received a quotation from the Sunbury Gas Company for the public lighting of the district under a new contract. It was £3 5s. per lamp per annum for incandescent lamps as at present in use, with a No. 3 burner and a 4 or 4½ cubic feet governor, and 3s. 3d. per 1000 cubic feet for any other gas used. At a recent meeting of the Council, at which the matter was considered, several members expressed the opinion that a fresh contract should not be entered into at this price; and it was suggested that one should be made under the existing conditions for six months, from September to March, by which time, it was said, the Council would see how the governors acted. The suggestion was agreed to.

Japanese Imports of Sulphate of Ammonia.—The imports of sulphate of ammonia to Japan have recently increased to an important extent. They amounted last year to 74,242 tons, valued at £1,090,400, which is 4879 tons more than in 1910, and 21,040 tons more than in 1909. The principal ports at which this product is imported are Kobe and Yokohama.

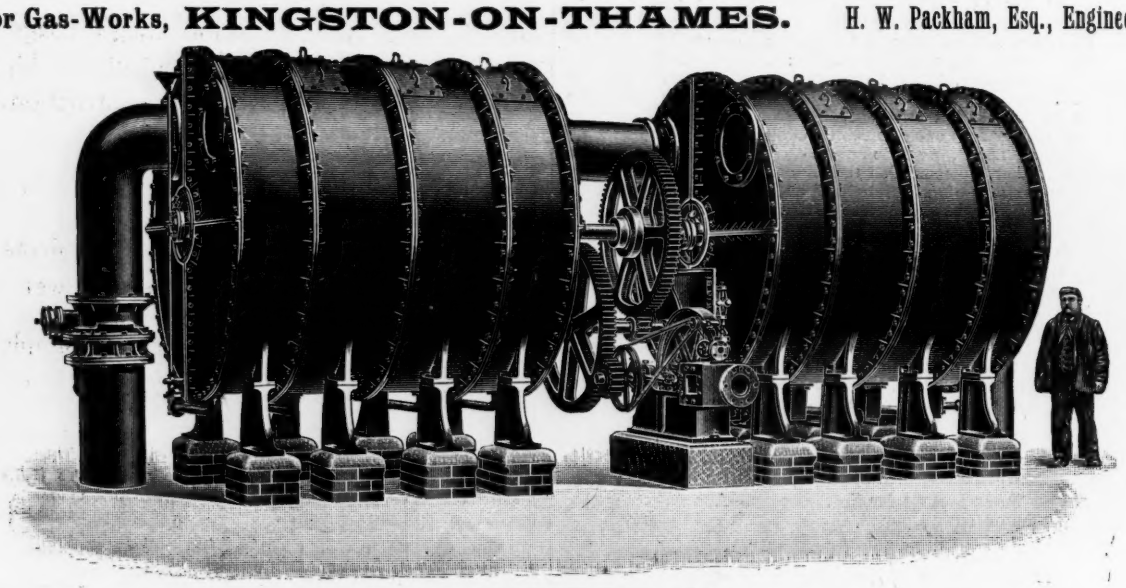
Northampton Gas Company.—At the fifty-fifth annual meeting of this Company last Thursday, the Directors reported that the total profits available for distribution were £12,094, out of which an interim half-year's dividend at the rate of 5 per cent. per annum had been paid; leaving a balance of £6110. They recommended the payment of a dividend for the past half year at the same rate as before (being the maximum allowed); the two dividends amounting, less income-tax, to £11,968, and leaving a balance of £126 to be carried forward. The Directors said this was a small amount compared with previous years; but it was satisfactory when the unsettled state of the coal trade during the year and the subsequent strike were taken into account. They reduced the price of gas from Midsummer, 1911, by 1d. per 1000 cubic feet all round, and that supplied for power purposes by an extra 2d. as from Christmas last; making the present net price of gas for power 1s. 6d. per 1000 cubic feet. Arrangements for the supply of coal for the ensuing year had been made at an increase on last year's prices. The business of the Company continued satisfactory, and further extensions of mains had been made in various parts of the district. The report was adopted; and the Directors and the Engineer and Manager (Mr. George S. Eunson) were congratulated upon having carried out their duties to the public in supplying gas notwithstanding the coal strike, which had cost the Company a large amount of money.

Comparative Dangers of Celluloid and Coal Gas.—The recent appalling fire in Moor Lane, E.C., as the result of the ignition of celluloid, led to comparisons being made between this article and coal gas and petrol; and they were followed by the assertion that celluloid is no more dangerous than the two illuminating agents named. In a letter in the Engineering Supplement to "The Times" last Wednesday, Dr. A. L. Mond said: "Such comparisons appear to me to be irrelevant and highly misleading. We are all perfectly well aware of the dangers associated with coal gas, petrol, &c.; and we take the necessary measures to guard ourselves against the dangers with which they are associated. When a coal gas or petrol accident occurs, it is in 99 cases out of 100 due to sheer carelessness. It is, however, very rarely the case that a celluloid accident (I refer to the aspect of the matter as it affects the general public, and not the manufacturer or dealer) is due to carelessness. In almost every case it is due to the fact that the member of the public concerned is unaware of the nature of the article. He believes it to be ivory or tortoiseshell, or some harmless imitation. It is not suggested that the trade in celluloid should be prohibited; but it is surely not too much to ask for legislation making it obligatory to mark any article, say, with the words, 'Celluloid, inflammable.' Notwithstanding this marking, the individual manufacturer could still maintain the trade name under which he sells this brand of celluloid."

ROTARY WASHER SCRUBBER.

Capacity 2,500,000 cubic feet per day,

For Gas-Works, KINGSTON-ON-THAMES. H. W. Packham, Esq., Engineer.



MAKERS:

R. & J. DEMPSTER, Ltd., MANCHESTER.

London Office:

165, GRESHAM HOUSE, OLD BROAD ST., E.C.

Slaithwaite and Gas-Works Purchase.—Notice has been given that at the next meeting of the Slaithwaite Urban District Council a resolution will be submitted that the Council form themselves into a committee to discuss the advisability of acquiring the local gas-works. When the notice was given, the Clerk pointed out that the question had been thrashed out a score of times, but the difficulty was that the Slaithwaite Gas Company had an Act which enabled them to supply Slaithwaite, Golcar, Linthwaite, and Marsden. The Council would have to get a Special Act, and then they would secure no powers to supply any other township; so that the scheme was impracticable. The only way would be for the four townships to combine to purchase the works.

Wandsworth and Putney Gas Company.—The accounts of the Company for the six months ended the 30th of June, which will be presented at the half-yearly meeting of shareholders next Tuesday, show a profit of £15,696; the revenue having been £91,963, and the expenditure £76,267. After providing for the interest on the debenture stock and on deposits and loans, there is, with the addition of the amount carried forward, a sum of £27,317 available for distribution; and the Directors recommend the declaration of dividends at the statutory rates per cent. per annum of £8 7s. 6d. on the "A" consolidated stock, £6 17s. 6d. on the "B" consolidated stock, and £5 17s. 3d. on the ordinary ("C") stock. The quantity of gas made in the half year was 650,552,000 cubic feet, of which 611,519,000 cubic feet were sold and 619,976,000 cubic feet accounted for. As announced in our "Parliamentary Intelligence," the Bill for the amalgamation of the Company with the Mitcham and Epsom Companies has received the Royal Assent.

The placing of the insurance of the buildings and contents of the Dukinfield Corporation Gas-Works with the Royal Insurance Company at 1s. 6d. per cent. has been approved by the Town Council.

At the Thatched House Hotel, Manchester, last Thursday, eight original fully-paid £10 (10 per cent. shares) in the Hyde Gas Company, Limited, were sold by auction and realized £21 2s. each. Ten new 7½ per cent. shares of like nominal value fetched £168s. 6d. per share.

The present workshop and stores of the Exeter Gas Company having been found too small to meet the increasing business, property has been acquired which will give the Company a capital building site, upon which it is intended to erect new workshops. With reference to the works of the Company, an order has been placed for an installation of vertical retorts to produce 1¼ million cubic feet of gas per day.

The minutes of the Gas Committee of the Southport Corporation to be submitted to the Council at the monthly meeting to-day include the following resolution: "That a subscription at the rate of 2s. 6d. per million cubic feet of gas manufactured by this Committee be paid to the British Commercial Gas Association for one year; but that the Committee reserve their right to consider whether the subscription shall be renewed for a further period at the end of a year."

APPLICATIONS FOR LETTERS PATENT.

17,429.—Bryne, J. F., and Howes and Burley, Limited, "Acetylene generators." July 26.
17,444.—Simpson, W. M., "Bunsen burners." July 27.
17,538.—Hayes, R. A., "Compressing air and gas." July 29.
17,550.—Dempster, R., and Sons, Limited, and Toogood, H. J., "Telpherage." July 29.
17,610.—Gathercole, G., "Gas-stoves." July 30.
17,616.—Toogood, H. J., and Dempster, R., and Sons, Limited, "Discharging vertical gas-retorts." July 30.
17,714.—Room, J., "Preventing waste in gas-rings." July 31.
17,732.—Kopper, H., "Regenerative furnaces." July 31.
17,773.—Bland, C. W., "Inverted burners." July 31.
17,776.—Boberg, O. S. T., and Techno-Chemical Laboratories, Limited, "Treatment of gases." July 31.
17,855.—Lake, W. E., "Charging and discharging gas-retorts." A communication from the Riter-Conley Manufacturing Company. Aug. 1.
17,919.—Parrot, G., "Stop-valve." Aug. 2.
17,921.—Duckham, A., and Duckham, A. M'D., "Obtaining oils and other products from coal." Aug. 2.
17,930.—Soc. Andre Citroen et Cie., "Mechanism for controlling systems of valves." Aug. 2.
17,943.—Schacke, G., "Observation of the passage of fluids through pipes." Aug. 2.
17,945.—Davis, H. N., and Twigg, W. R., "Fuel for gas-fires." Aug. 2.
17,946.—Cole, S. W., "Washing or purifying gas." Aug. 2.
17,956.—Evered, S., and Boxall, J. E., "Incandescent burners." Aug. 2.
17,970.—Guy, F. H., "Supplying a mixture of gas and air." Aug. 3.
17,981.—Carter, C. F., and Hawley, A., "Generators for acetylene." Aug. 3.
18,009.—Aronowitz, I. J., "Gas-fittings." Aug. 3.
18,019.—Schmidt, F., Dampfkesselfabrik Zweigniederlassung der Sangerhauser Aktien-Maschinenfabrik und Eisengieberei vormals Hornung und Rabe, "Pipes." Aug. 3.

At the meeting of the Directors of the Derby Gas Company last Wednesday, an interim dividend at the rate of 5 per cent. per annum, less income-tax, on the ordinary consolidated stock was declared for the half year ended the 30th of June.

Under the title of the Vacuum Electric and Gas Heating Appliances, Limited, a Company has been formed, with a capital of £100,000, in £1 shares, to acquire, work, develop, and turn to account certain inventions and patent rights for the heating of steam, water, and air by gas and electricity, and to adopt an agreement with J. Mann.

Gas-Heated

WASH BOILERS.

Wash Boilers have to stand rough usage. They are subject to conditions which quickly reveal any weak points in their construction.

The "MAIN"

Gas-Heated Wash Boilers are made accordingly. They look well and last well.

They are economical and efficient, simple and cheap.

R. & A. MAIN, Limited,

WORKS:
Gothic Works, EDMONTON, N.; Gothic Iron-Works, FALKIRK; and Gothic Works, BIRMINGHAM.

SHOW-ROOMS AND BRANCHES:
25, Princes St., Oxford Circus, W.; 136, Renfield St., GLASGOW; 56, Broad St., BIRMINGHAM; 83, Old Market St., BRISTOL; 13, Whitworth St. West, MANCHESTER; 8, Exchange Place, Donegall St., BELFAST; 333, Queen St., MELBOURNE; and 12, Cunningham Lane, Pitt St., SYDNEY.

The Alton Gas and Coke Company, Limited, is the title of the old Alton Company re-registered on the 7th inst., with a capital of £5750 in £1 shares.

Robinlyte (Foreign Patents), Limited, has been registered with a capital of £10,000, in £1 shares, to carry on the business of manufacturers of gas-mantles.

The steam collier *Walter Jervase*, trading between Exeter and Goole for the Exeter Gas Company, turned turtle in a boisterous sea, on the 2nd inst., about a mile off Spurn Head, and three out of the crew of eleven were drowned. The vessel and cargo were insured.

At last Wednesday's meeting of the Stockport Town Council, a number of recommendations made by the Gas Committee as to increases in wages of employees at the gas-works were confirmed, including one advancing the salary of Mr. J. F. West, the Outdoor Superintendent, by £20 per annum.

At the Burton-upon-Trent Flower Show and Fête, which opened on the 31st ult., the Gas and Electricity Committee of the Corporation made an excellent display of appliances for the use of gas in the home and the workshop. Incandescent gas-lamps were employed to light the entrance at either end of the show ground. The exhibit, which was a most interesting one, was arranged by Mr. R. S. Ramsden, the Assistant Gas Manager.

In moving the adoption of the Gas Committee's proceedings at last Wednesday's meeting of the Manchester City Council, Mr. S. Kay, the Chairman, referring to the acceptance of West's Gas Improvement Company's contract for an installation of Glover-West vertical retorts at the Rochdale Road station, said it would be satisfactory to the Council to know that the manufacture of gas there was to be made much more efficient and greatly increased without any borrowing of money.

GAS COMPANIES' STOCK AND SHARE LIST.

The past week has not been entirely satisfying to the Stock Exchange; for upon the resumption of operations after the Bank Holiday interval business was, and remained more or less, sluggish, owing to a paucity of attendance in the earlier part of the week. Against this, however, might be set the fact that the majority of the more dominant factors were favourable, which infused a welcome element of cheerfulness in most of the markets. Thus, the closing prices showed a distinct, though moderate, improvement, especially in Railways and the gilt-edged group. The reopening on Tuesday was very slow; and all markets continued quiet throughout the day. Home Government issues were somewhat irregular; but Consols finished at an advance of ¼. Rails were inactive, but prices held firm. Movements in Americans were uneven. Business on Wednesday was still going slow. Government issues looked stronger, but Consols were unchanged. Railways were a quiet market, and gave no marked sign. Thursday was a much better day; but business was not so brisk but that they could have done with a little more of it. The tone, however, was quite cheerful. After some little uncertainty, Consols closed without change; but Rails were decidedly strong, and the tendency was firmest at the finish. Americans also looked well, with higher prices all through the list; and Foreign were steady. Friday was fairly good; but not all markets closed at their best. Gilt-edged were moderately firm. Consols seemed as if they would rise, but they did not. Rails failed to improve—wanting more support. The tendency on Saturday was more favourable. Consols hardened, closing at 74½-74¾—a rise of ¼ in the week. Rails were a good market. In the Money Market, an ample supply kept rates from rising; but discount was harder. Business in the Gas Market was very fair in point of volume, considering the time of year. Changes in quotation were few and slight; and the tendency in general was firm. In Gaslight and Coke issues, the ordinary continued in good demand at higher prices; transactions showing an advance from 106 to 108—a rise of 1. The secured issues were very quiet; the maximum realizing 84, the preference from par to 100¾, and the debenture from 75 to 76. There was hardly anything doing in South Metropolitans; only two or three bargains being recorded at from 117¾ special to 119. The debenture was done at 76½. In Commercials, the only deal was one in the debenture at 75. Among the Suburban and Provincial group, Alliance and Dublin debenture was done at 87, Brighton original at 216¾ and 218, British at 44½ to 45, Ilford "A" at 157½, and South Suburban at 123. In the Continental companies, Imperial changed hands at 175 to 178, Union marked 84¾, and European 19¼. Among the undertakings of the remoter world, Bombay made 6¾, Monte Video from 11 to 11 5/16, Melbourne 102, Primitiva from 7 3/16 to 7 5/16, ditto preference 5⅜ and 5 5/16, ditto debenture 97¼, and San Paulo preference 12 1/16.

Issue.	Share.	When ex Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
1,551,868	Stk.	Apl. 12	5	Alliance & Dublin Ord.	73—78	..	6 8 2
374,000	Stk.	July 12	4	Do. 4 p.c. Deb.	89—91	..	4 7 11
250,000	5	Apl. 12	7½	Bombay, Ltd.	6—6½	..	5 15 5
50,000	10	Feb. 29	15	Bourne- mouth Gas and Water } 10 p.c. B 7 p.c. Pref. 6 p.c.	28⅞—29½	..	5 1 8
332,000	10	"	7		16—16½	..	4 4 10
75,000	10	"	6		14½—14⅝	..	4 1 4
380,000	Stk.	"	13½†	Brentford Consolidated	260—265	..	5 1 11
330,000	"	"	10½†	Do. New	198—203	..	5 3 5
50,000	"	"	5	Do. 5 p.c. Pref.	118—120	..	4 3 4
206,250	"	June 14	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
219,055	Stk.	Feb. 29	11	Brighton & Hove Orig.	215—220	..	5 0 0
244,200	"	"	8	Do. A Ord. Stk.	156—159	..	5 0 8
490,000	30	Mar. 28	12½	British	44½—45½	..	5 9 11
120,000	Stk.	June 28	4	Do. 4 p.c. Deb. Stk.	91—93	..	4 6 0
109,000	"	Feb. 15	6	Bromley, A 5 p.c.	130—135	..	4 8 11
165,700	"	"	4½	Do. B 3½ p.c.	100—103	..	4 7 5
82,378	"	"	5½	Do. C 5 p.c.	119—122	..	4 10 2
55,000	"	June 28	3½	Do. 3½ p.c. Deb.	78—80	..	4 7 6
250,000	Stk.	"	4	Buenos Ayres 4 p.c. Deb.	93—95	..	4 4 3
100,000	10	—	—	Cape Town & Dis., Ltd.	2—3	..	—
100,000	10	—	—	Do. 4½ p.c. Pref.	3½—4½	..	—
100,000	Stk.	June 28	4½	Do. 4½ p.c. Deb. Stk.	74—76	..	5 15 5
157,150	Stk.	Feb. 15	5	Chester 5 p.c. Ord.	110—112	..	4 9 3
1,513,280	Stk.	Feb. 29	5/9/4	Commercial 4 p.c. Stk.	108—110	..	4 19 4
560,000	"	"	5½	Do. 3½ p.c. do.	103—105	..	5 1 6
475,000	"	June 14	3	Do. 3 p.c. Deb. Stk.	73—75	..	4 0 0
800,000	Stk.	May 31	4	Continental Union, Ltd.	83—86	..	4 13 0
200,000	"	"	7	Do. 7 p.c. Pref.	133—135	..	5 3 8
492,270	Stk.	—	5½	Derby Con. Stk.	122—124	..	4 8 9
55,000	"	—	4	Do. Deb. Stk.	104—105	..	3 16 2
840,150	10	July 26	10	European, Ltd.	19—20*	..	5 0 0
16,160,600	Stk.	Feb. 15	4/17/4†	Gas-light and Coke } 4 p.c. Ord. 3½ p.c. max. 4 p.c. Con. Pref. 3 p.c. Con. Deb.	106—108	+1	4 10 3
2,600,000	"	"	3½		82—85	−½	4 2 4
4,062,235	"	"	4		99—101	..	3 19 3
4,531,705	"	June 14	3		74—76	..	3 18 11
258,740	Stk.	Mar. 14	5	Hastings & St. L. 3½ p.c.	93—95	..	5 5 3
82,500	"	"	6½	Do. do. 5 p.c.	—	..	—
70,000	10	Apl. 26	11	Hongkong & China, Ltd.	16¾—17	..	6 9 5
131,000	Stk.	Mar. 14	7½	Ilford A and C	155—158	..	4 14 11
65,780	"	"	6	Do. B	123—125	..	4 16 0
65,500	"	June 28	4	Do. 4 p.c. Deb.	91—93	..	4 6 0
4,940,060	Stk.	May 15	9	Imperial Continental	175—180	..	5 0 0
1,235,000	Stk.	Feb. 15	3½	Do. 3½ p.c. Deb. Red.	88—90	..	3 17 9
200,242	Stk.	Mar. 14	6	Lea Bridge Ord. 5 p.c.	125—129	..	4 13 0
561,000	Stk.	Feb. 29	10	Liverpool United A.	216—218	..	4 11 9
718,100	"	"	7	Do. B.	156—158	..	4 8 7
306,083	"	June 28	4	Do. Deb. Stk.	99—101	..	3 19 3
75,000	5	June 14	6	Malta & Mediterranean	4⅛—4⅞	..	6 3 1
560,000	100	Apl. 1	5	Met. of } 5 p.c. Deb.	—	..	—
250,000	100	"	4½	Melbourne } 4½ p.c. Deb.	101—103	..	4 7 5
541,920	20	May 31	3½	Monte Video, Ltd.	11—11½	−⅛	6 1 9
1,775,892	Stk.	July 26	4½	Newc'tle&G'tesh'd Con.	98—99*	..	4 8 5
529,705	Stk.	June 28	3½	Do. 3½ p.c. Deb.	85—85½	..	4 1 10
55,940	10	Feb. 29	7/7/0	North Middlesex 7 p.c.	14—15	..	4 18 0
300,000	Stk.	May 15	8	Oriental, Ltd.	134—136	..	5 17 8
60,000	5	Mar. 14	8	Ottoman, Ltd.	7¾—8¼	+⅛	4 17 0
31,800	53	Feb. 29	13	Portsea Island A	—	..	—
60,000	50	"	13	Do. B	130—133	..	4 17 9
100,000	50	"	12	Do. C	127—130	..	4 12 4
398,490	5	May 15	8	Primitiva Ord.	7⅛—7⅜	..	5 8 6
796,980	5	June 28	5	Do. 5 p.c. Pref.	5 5/16—5 7/16	+1/16	4 11 11
488,900	100	June 1	4	Do. 4 p.c. Deb.	96—98	..	4 1 8
312,650	Stk.	June 22	4	River Plate 4 p.c. Deb.	93—95	..	4 4 3
275,000	5	Apl. 12	12	San Paulo, Ltd.	13½—14½	..	4 2 9
150,000	10	"	6	Do. 6 p.c. Pref.	11⅝—12¼	..	4 18 0
125,000	50	July 1	5	Do. 5 p.c. Deb.	49—51	..	4 18 0
135,000	Stk.	Mar. 14	10	Sheffield A	234—236	..	4 4 9
209,984	"	"	10	Do. B	233—235	..	4 5 1
523,500	"	"	10	Do. C	233—235	..	4 5 1
90,000	10	May 31	7½	South African	8—9	..	8 6 8
6,429,895	Stk.	Feb. 15	5/9/4	South Met., 4 p.c. Ord.	117—119	..	4 11 9
1,895,445	"	July 12	3	Do. 3 p.c. Deb.	76—79	..	3 15 11
209,820	Stk.	Feb. 29	8½	South Shields Con. Stk.	159—161	..	5 5 7
605,000	Stk.	Feb. 15	5/16/8	S'th Suburb'n Ord. 5 p.c.	122—124	..	4 14 0
60,000	"	"	5	Do. 5 p.c. Pref.	117—120	..	4 3 4
117,058	"	July 12	5	Do. 5 p.c. Deb. Stk.	120—122	..	4 2 0
502,310	Stk.	May 15	5	Southampton Ord.	105—107	..	4 13 6
120,000	Stk.	Feb. 15	7¼†	Tottenham and } A 5 p.c. B 3½ p.c.	144—147	..	4 18 8
483,940	"	"	5¼†		116½—118½	..	4 17 0
149,470	"	June 28	4	Edmonton } 4 p.c. Deb.	94—96	..	4 3 4
182,380	10	June 15	5	Tuscan, Ltd.	8½—8⅝	..	5 15 11
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	97—99	..	5 1 0
236,476	Stk.	Feb. 29	5	Tynemouth, 5 p.c. max.	112—114	..	4 7 9
255,636	Stk.	"	6¾	Wands- worth } B 3½ p.c. 3 p.c. Deb. Stk.	141—144	..	4 15 6
85,766	"	June 28	3		70—72	..	4 3 4

Prices Marked * are "Ex Div." † Next dividend will be at this rate.

WANTED, FOR SALE, CONTRACTS, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Appointments, &c., Vacant.

DRAUGHTSMAN. West's Gas Improvement Company.
SECRETARY-MANAGER. Stourport Gas Company.

Agency Open for United Kingdom (Producer Furnaces, &c.).

EMILE GOBBE ET FILS, Jumet, Belgium.

Appointments, &c., Wanted.

LEADBURNER, &c. Masonic, 118, Galloway Road, Shepherd's Bush.

Plant, &c. (Second-Hand), for Sale.

LAMP COLUMNS AND LANTERNS, Barnsley Gas Company.
SCRUBBER-WASHER, &c. Redditch Gas-Works.

Patent Licences, &c.

"HIGH PRESSURE BURNERS, &c." Marks and Clerk, Lincoln's Inn Fields, W.C.

Meetings.

BARNET GAS AND WATER COMPANY. Holborn Restaurant. Aug. 30. 12.30 o'clock.
MITCHAM AND WIMBLEDON GASLIGHT COMPANY. Offices, Western Road, Mitcham. Aug. 27. Three o'clock.
NORTH MIDDLESEX GAS COMPANY. 5, Great Winchester Street, E.C. Aug. 26. 2.30 o'clock.
RIDDINGS GAS COMPANY. 6 and 7, Queen Street, E.C. Aug. 30. 3.30 o'clock.

TENDERS FOR

Coal and Cannel.

BRADFORD GAS DEPARTMENT. Tenders by Sept. 2.
ROCHDALE CORPORATION. Tenders by Aug. 28.
SHEFFIELD GASLIGHT COMPANY. Tenders by Aug. 16.
STRATFORD-ON-AVON GAS DEPARTMENT. Tenders by Aug. 17.

Oxide of Iron.

SALFORD GAS DEPARTMENT.

Vertical Retort Plant.

CLECKHEATON URBAN DISTRICT COUNCIL. Tenders by Aug. 19.